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

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

May 8, 2015

Exemption No. 11510
Regulatory Docket No. FAA–2015–0445

Mr. Thomas Ashman
AeroHarvest, LLC
300 N. 3rd St.
Lompoc, CA 93436

Dear Mr. Ashman:

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

By letter dated February 19, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of AeroHarvest, LLC (hereinafter petitioner or operator) for an exemption. The exemption would allow the petitioner to operate an unmanned aircraft system (UAS) to conduct precision photogrammetry and crop scouting at the resolutions necessary for precision agriculture.

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

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

Airworthiness Certification

The UAS proposed by the petitioner is an E384.

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 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. 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, AeroHarvest, 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, AeroHarvest, 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 E384 when weighing less than 55 pounds including payload. Proposed operations of any other aircraft will require a new petition or a petition to amend this exemption.

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

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

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

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

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

7. This exemption and all documents needed to operate the UAS and conduct its operations in accordance with the conditions and limitations stated in this grant of exemption, are hereinafter referred to as the operating documents. The operating documents must be accessible during UAS operations and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in this exemption and the procedures outlined in the operating documents, the conditions and limitations herein take precedence and must be followed. Otherwise, the operator must follow the procedures as outlined in its operating documents. The operator may update or revise its operating documents. It is the operator's responsibility to track such revisions and present updated and revised documents to the Administrator or any law enforcement official upon request. The

operator must also present updated and revised documents if it petitions for extension or amendment to this grant of exemption. If the operator determines that any update or revision would affect the basis upon which the FAA granted this exemption, then the operator must petition for an amendment to its grant of exemption. The FAA's UAS Integration Office (AFS−80) may be contacted if questions arise regarding updates or revisions to the operating documents.

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

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

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

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

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

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

14. The operator may not permit any PIC to operate unless the PIC demonstrates the ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption, including evasive and emergency maneuvers and maintaining appropriate distances from persons, vessels, vehicles and structures. PIC qualification flight hours and currency must be logged in a manner consistent with 14 CFR § 61.51(b). Flights for the purposes of training the operator's PICs and VOs

(training, proficiency, and experience-building) and determining the PIC's ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption are permitted under the terms of this exemption. However, training operations may only be conducted during dedicated training sessions. During training, proficiency, and experience-building flights, all persons not essential for flight operations are considered nonparticipants, and the PIC must operate the UA with appropriate distance from nonparticipants in accordance with 14 CFR § 91.119.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Enclosures

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February 19, 2015

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

Re: Petition of AeroHarvest, LLC for an Exemption Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012

To Whom It May Concern,

Pursuant to Section 333 of PL 112-95 commonly known as the "FAA Modernization and Reform Act of 2012" or "The Reform Act", AeroHarvest LLC (d/b/a AeroHarvest), hereby applies for authorization to conduct commercial unmanned aerial systems (UAS) operations for the California agriculture industry within the United States National Airspace System (NAS); within Class G and occasionally E airspace, along with additional restrictions identified herein.

The requested exemption would support an application for a commercial Certificate of Authorization to use the E384 fixed wing UAS to support agriculture. The E384 system consists of a lightweight (1.5 lb) battery operated aircraft, a PC-based ground control station, and associated communications equipment. The aircraft carries an onboard geo-referenced still camera that allows it to conduct precision photogrammetry and crop scouting at the resolutions necessary for precision agriculture. This high-resolution data can direct variable irrigation and seeding rates as well as the precise application of fertilizers, pesticides and herbicides. This data helps farmers to maximize yields while reducing costs and impacts to the environment. By approving these exemptions, the FAA will create benefits to both agriculture and the environment which are ultimately in the public interest.

This petition for exemption is made based on information outlined in this Petition for Exemption, as well as the referenced E384 Operations Manual and E384 Maintenance Manual. AeroHarvest will provide these supporting materials upon request as confidential documents pursuant to 14 C.F.R. § 11.35(b), as the materials contain confidential commercial and/or proprietary information that AeroHarvest has not and will not share with others. Additionally, these documents contain operating conditions and procedures that are not generally available to the public and are protected from release under the Freedom of Information Act, 5 U.S.C. § 552 *et seq.*, and any other requirements established by the FAA pursuant to Section 333 of the Reform Act.

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Additional Documentation available upon request:

- AeroHarvest Business Strategy (Appendix A)
- E384 Operations Manual (Appendix B)
- E384 Maintenance Manual (Appendix C)
- Event 38 Training Syllabus (Appendix D)

I. Petition Summary

Pursuant with Section 333 of the FAA Modernization and Reform Act of 2012, AeroHarvest requests exemption from the following Federal Aviation Regulations that are found under Title 14 of the Code of Federal Regulations (CFR): 61.113 (a) and (b), 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), 91.417 (a) and (b). AeroHarvest seeks expedited approval and exemption from the CFRs listed above in order to operate the E384 Unmanned Aircraft System (UAS) for the purpose of providing high resolution aerial imagery to domestic agriculture and viticulture management companies as part of our consulting services. Operation of the E384 by AeroHarvest will follow strict operational limitations as outlined in this document and all recommendations by the FAA.

II. Background

A. Description of Petitioner: AeroHarvest

AeroHarvest was founded in 2015 by Thomas Ashman with the express mission of providing Central Coast growers and crop managers with the tailored and flexible low altitude remote sensing, data processing, and crop consulting services to help improve yields on every acre and make informed decisions to reduce costs and environmental impact.

The AeroHarvest team carries an impressive mix of skills and experience in the aviation and agriculture industries. The founder has served in the United States Air Force for nine years as an aircraft maintenance manager on various airframes. His graduate capstone project for the Master of Science degree program in business management from Embry-Riddle Aeronautical University presented subjective research findings focused on crop manager perceptions, expectations and willingness to incorporate UAS technology in day-to-day and seasonal operations. The lead crop consultant on the AeroHarvest team, Andrew Moya, has eight years of experience working in the California wine and agriculture industries. He holds current licenses as a certified pest control advisor (PCA) and a certified crop advisor. He hold a Bachelor of Science degree in bio-resource and agricultural engineering.

NOTE: Confidential biographies available upon request

B. Description of UAS: E384

The E384 UAS is manufactured by Event 38 located in Akron, Ohio. The system consist of a lightweight battery operated aircraft, ground control station, and associated data link equipment. The E384 airframe is constructed of EPO foam with a carbon fiber tail and weighs 5.9 lbs. with a wingspan of 6.2 ft. and total length of 4.3 ft. The E384 is powered by two lithium polymer batteries that drive an electric propeller. It is hand launched, has maximum flight time of 100 minutes, and operates at a cruising speed of 27 mph. The ground control station consist of a Turnigy 9XR remote and PC computer which have a maximum data link range of 5.4 NM. If the E384 loses link with the ground control station or detects a low battery state at any time it will initiate a return-to-launch sequence.

The E384 has extensive flight experience and a history of operational success overseas, including flights by over one hundred professional operators on 6 continents. It has been used in Uganda to survey potential land for the construction of a hydroelectric power plant. It has also been used in Greece by the National Technical University of Athens to study open-pit mining. In Belize the Fishery Department started routine flights with the E384 to track illegal fishing in protected waters. More recently in the United States the E384 was flown over three days at the Cleveland Airshow, demonstrating its ability to safely integrate and operate in the NAS.

For additional information on the E384, reference Appendix B (E384 Operations Manual) and Appendix C (E384 Maintenance Manual), which specify manufacturing information, aircraft performance, operating limits, normal and emergency procedures, fail-safe features, and maintenance and inspection procedures.

C. Description of Proposed Operations

AeroHarvest intends to use small UASs weighing less than 55 pounds for the purpose of conducting aerial surveys and inspections of wine vineyards and other crops. All UAS operations will occur under tightly controlled conditions on privately owned vineyards and farms at the owner's request and consent. These vineyards and farms are generally located in rural valleys away from people, crowds, and buildings. The proposed UAS operations will be conducted in accordance with the conditions and limitations of this Petition for Exemption and the E384 Operations Manual. Among other things, proposed UAS operations conducted by AeroHarvest will be limited to daytime VFR conditions in uncontrolled airspace, and will occur at altitudes at or below 400 feet AGL and at least 5 miles away from any airport.

III. Statutory Authority

A. FAA Modernization and Reform Act of 2012, Section 333

Section 333 (a) states that the FAA "shall determine if certain unmanned aircraft systems may operate safety in the national airspace system before completion of the plan and rulemaking required by Section 332". Section 333 (b) then lists several factors that should be considered in determining which UAS would be eligible for expedited integration into the National Airspace System (NAS). Specifically, Section 333 describes UAS that "as a result of their size, weight, speed, operational capability, proximity to airports and populated areas, and operation within visual line of sight do not create a hazard to the users of the national airspace system or the public, or pose a threat to national security". If a UAS meets the criteria laid forth in Section 333 (b), Section 333 (c) then gives the FAA the authority to decide if an airworthiness certification as specified by Title 49 United States Code, Section 44704 is even required for operation. Section 333 (c) specifically states that the FAA can determine "whether a certificate of waiver, certificate of authorization, or airworthiness certification under section 44704 of Title 49, United States Code, is required for the operation of unmanned aircraft systems". Thus, the FAA has the ability to allow a UAS that meets the criteria put forth in Section 333 (b) to operate within the NAS without an airworthiness certification as long as the UAS does not pose any hazard or threat to the NAS, public, and national security.

B. How AeroHarvest meets the criteria laid forth in Section 333

Below are the criteria laid forth in Section 333 (b) and a detailed description of how AeroHarvest meets each of these criteria.

1. Size, Weight, and Speed

The E384's foam airframe weighs 5.9 lbs., has a 6.2 ft. wingspan, length of 4.3 ft., and operates at cruising speeds of 27 mph. This small, lightweight aircraft that operates at relatively slow speeds poses little to no hazard to people or structures on the ground, thus making it an exponentially safer alternative to manned, fixed wing aircraft for aerial imaging.

2. Operational Capability

The primary function of the E384 is to provide aerial imagery using one of two interchangeable geo-reference still cameras. High resolution data generated from these cameras offer a wide range of applications through analysis, such as biomass estimation, yield monitoring, leaf area indexing, and overall crop health. This information then helps companies maximize crop yields, which is of great benefit to the economy and the public.

The E384 is hand launched on-site, requiring no runway for take-off and landing and no transit to and from the site. Once airborne, the E384 will fly at an altitude of 400 ft. AGL or less over the designated agricultural plot. Prior to flight, the Pilot in Command (PIC) sets a designated flight area and flight parameters to ensure that the E384 will remain within the confines of the approved site and not exceed a maximum altitude 400 ft. AGL. If a critical issue such as a low battery state or a loss of datalink is detected at any time the E384 will immediately execute a return-to-launch sequence (Reference Appendix B). The E384's small operational footprint and built-in safety protocol provide a much safer alternative for aerial imaging and would pose a minimal hazard to the NAS or public.

3. Proximity to Airports/Populated Areas

All UAS operations will occur under tightly controlled conditions on privately owned vineyards and farms at the owner's request and consent. These vineyards and farms are generally located in rural valleys away from people, crowds, and buildings. The proposed UAS operations will be conducted in accordance with the conditions and limitations of this Petition for Exemption and the E384 Operations Manual. Pproposed UAS operations conducted by AeroHarvest will occur at altitudes at or below 400 feet AGL and at least 5 miles away from any airport.

4. Visual Line of Sight (VLOS)

The E384 will be flown in accordance with day Visual Flight Rules (VFR) and only in Visual Meteorological Conditions (VMC) during day-light hours. The E384 will operate within 1 NM and VLOS of the PIC at an altitude 400 ft. AGL or less. When used, the Visual Observer (VO) will be responsible for ensuring that the E384 remains within VLOS at all times and will also assist in spotting potential hazards. When a VO is not used, the PIC will be responsible for maintaining VLOS.

C. Other Relevant Factors

1. Operational Limitations

AeroHarvest has established the following operational limitations for E384 flights over designated sites.

- E384 flights are only permitted over designated sites
- The E384 will only operator in Class G and occasionally Class E airspace. When operation in Class E airspace is required, Air Traffic Control (ATC) permission will be obtained
- The E384 will operate at or below 400 ft. AGL
- The E384 will operate within VLOS of the PIC or VO (when used)
- The VO (when used) will be located next to the PIC and will ensure the aircraft remains within VLOS and assist in spotting potential hazards
- The E384 will remain close enough to the operator for the operator to be capable of seeing the aircraft with vision unaided by any device other than corrective lenses
- The E384 will operate in accordance with Day Visual Flight Rules and only in Visual Meteorological Conditions during official daylight hours (local time)
- E384 operations will only be conducted with minimum weather visibility of 3 miles from the E384 control station
- The duration of each E384 flight shall not exceed 100 minutes
- All take-off and landings will occur on-site in accordance with the E384 Operations Manual (Reference Appendix B)
- E384 flights will avoid direct overflight of any office or maintenance buildings located on-site
- The E384 will not operate over any persons not directly involved in the operation
- The PIC will yield right-of-way to other aircraft, manned or unmanned
- The PIC will conduct a preflight inspection of the E384 in accordance with the E384 Operations manual (Reference Appendix B) and determine that the E384, along with any supporting equipment, is safe for operation
- All employees working on-site will be thoroughly briefed on E384 operations prior to operations commencing
- E384 operations will be conducted by certified unmanned aircraft operators with small UAS rating who have completed Event 38's Training Program (Reference Appendix D)
- E384 flights will be cancelled in the event that any aircraft or ground control station equipment is inoperative or not fully functional
- If the PIC or VO spot a potential hazard, such as a manned aircraft within close proximity to the designated flight area, the PIC will immediately land the E384 and operations will only resume after the hazard is clear of the area
- All E384 maintenance will be accomplished in accordance with the E384 Maintenance Manual (Reference Appendix C)
- Only one E384 will be airborne at any given time for each designated site
- The PIC will file a NOTAM for E384 flights at each site, providing at a minimum radial/DME, radius, and a date/time group
- The E384 will display its registration markings in accordance with 14 CFR Part 45

AeroHarvest will be bound by these limitations for commercial flights after FAA approval of the exemptions laid forth in this petition. AeroHarvest will also follow any guidance from the FAA in accordance with Sec 333 (c) which states that after determining if a UAS meets the criteria for safe operation that the FAA "shall [also] establish requirements for the safe operation of the" UAS in the NAS.

2. Operating Locations

AeroHarvest seeks approval to conduct precision agriculture operations at sites that meet the following criteria: 1) site is owned and operated by an AeroHarvest customer who has granted express permission to conduct operations 2) site consists of agricultural plots, and 3) no airports are within 5 NM of the site. AeroHarvest will also comply with any additional requirements or restrictions the FAA may have for E384 operations at these future sites.

IV. Basis for Petition

A. Petitioner Information

AeroHarvest, LLC
300 N. 3rd St
Lompoc, CA 93436
Phone: 805-743-3526
Email: thomas@aeroharvest.com

B. Specific Sections of 14 CFR from which AeroHarvest Seek Exemption

- 61.113 (a) and (b)
- 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)
- 91.417 (a) and (b)

C. Public Interest

The proposed UAS operations in this petition will benefit the public by improving farmers' ability to make environmentally responsible management decisions, promote job creation in California, and advance the integration of UAS into the NAS.

High-resolution aerial collection from small UAS will enable AeroHarvest to conduct precision agriculture with significantly improved detail allowing crop managers to apply water, fertilizer and chemicals only where absolutely necessary in only the amounts necessary at periodic intervals. The incentive for farmers and crop managers goes beyond environmental responsibility. The increased precision helps farmers maximize yields while reducing input costs. The ability to spray

pesticides in select regions also reduces human exposure to pesticides and mitigates negative side-effects on the ecology of the farm/vineyard associated with overuse of pesticides. The public as a whole will benefit from an agricultural industry that can harness the power of new technologies to produce better crops in a cost-effective, sustainable and environmentally conscious manner.

The ongoing drought in California poses serious concerns for the state's agriculture industry. This year, 42 of the California's 58 counties were declared natural disaster areas due to damages and losses blamed on the drought. This is of course a two way street. Agriculture and manufacturing account for four-fifths of all water use by businesses and residences. This interdependency presents a number of serious business risks for the region. California businesses are also prone to short-term losses from floods and earthquakes. As greenhouse gas induced climate change continues to take hold, these concerns are likely to become increasingly volatile. On the other hand, there are positive trends to look forward to, such as increased efficiencies in agricultural water use. Precision agriculture may play an increasingly important role in this effort.

Economists portend that California will be the top state in the U.S. when it comes to UAS expenditures in coming years. While economic conditions are favorable overall to support the growth of commercial UAS across many sectors, the boon is also expected to kickback significant economic growth and job creation across the state, mostly in agriculture and public safety responders. The exemption which would permit AeroHarvest to conduct operations would also permit an early beginning to the growth of the UAS industry in California.

AeroHarvest intends to conduct UAS operations in a legally and environmentally responsible manner which sets the standard for the industry. Compliance with local and federal laws as well as prudent operational caution will reduce the likelihood of mishaps and mitigate risks to the public. With the experience this team has acquired in both aviation and agriculture; the FAA will provide a great service to the California public and the American public by approving AeroHarvest's exemption request.

D. Additional Information, Views, and Arguments

The following appendices are available upon request and should be treated confidentially for proprietary reason.

- AeroHarvest Business Strategy (Appendix A)
- E384 Operations Manual (Appendix B)
- E384 Maintenance Manual (Appendix C)
- Event 38 Training Syllabus (Appendix D)

E. Summary for Federal Register

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012, AeroHarvest requests exemption from the following Federal Aviation Regulations that are found under Title 14 of the Code of Federal Regulations (CFR): 61.113 (a) and (b), 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), 91.417 (a) and (b). Exemption from these regulations would allow AeroHarvest to operate the E384 Unmanned Aerial System over domestic vineyards and agricultural land sites for the purpose of collecting high resolution aerial imagery of agricultural plots for use in crop consulting services.

F. Conclusion

Pursuant to Section 333 of PL 112-95 commonly known as the "FAA Modernization and Reform Act of 2012" or "The Reform Act", AeroHarvest LLC (d/b/a AeroHarvest), hereby applies for authorization to conduct commercial unmanned aerial systems (UAS) operations for the agriculture, oil and gas, aerial photography and wildlife preservation industries, within the United States National Airspace System (NAS); within Class G and occasionally E airspace.

Throughout this exemption request, AeroHarvest has shown how their expertise and knowledge with UAS technology will ensure the public's best interest is at hand and assist the FAA with their charge to: "…safely accelerate the integration of civil unmanned aircraft systems into the national airspace system…" as directed by Congress. They have also shown how the approval of this request will meet and exceed "…at least an equivalent level of safety…" for the regulations from which they seek exemption.