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

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

June 23, 2015

Exemption No. 11885
Regulatory Docket No. FAA–2015–0845

Mr. James Knuckey
John R Jurgensen, Company
11641 Mosteller Road
Cincinnati, OH 45241

Dear Mr. Knuckey:

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 John R Jurgensen, Company (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial imagery operations to create 3D information and orthographic photos.

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 Event38 E384.

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]. 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, John R Jurgensen, Company 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, John R Jurgensen, Company 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 Event38 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 June 30, 2017, unless sooner superseded or rescinded.

Sincerely,

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

Enclosures

Project Officer: _____

JAMES KNUCKEY
JOHN R JURGENSEN COMPANY
11641 MOSTELLER RD
CINCINNATI OH 45241

John R Jurgensen, Company's Petition for Exemption for the Event 38 E384 Unmanned Aerial System

FAA Rules Docket: _____

Submitted on 25 March 2015

John R Jurgensen, Company
11641 Mosteller Road
Cincinnati, Ohio 45241
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* Documents were submitted confidentially for proprietary reasons and will not be available to the public

A. Petition Summary

Pursuant with Section 333 of the FAA Modernization and Reform Act of 2012, John R Jurgensen, Company (JRJ) requests exemption from the following Federal Aviation Regulations that are found under Title 14 of the Code of Federal Regulations (CFR): Part 21 Subpart H, 45.23 (b), 91.7 (a), 91.9 (b), 91.103, 91.109, 91.119, 91.121, 91.151 (a), 91.203 (a) (b), Part 91 Subpart E (91.40191.417). JRJ seeks expedited approval and exemption from the CFRs listed above in order to operate the E384 Unmanned Aircraft System (UAS) for the purpose of gathering high resolution aerial imagery to create 3D information and orthographic photos. Operation of the E384 by JRJ will follow strict operational limitations as outlined in this document and all recommendations by the FAA.

B. Background

1. John R Jurgensen, Company

JRJ is a large highway construction company and owner of several quarry operations in Ohio, Indiana and Kentucky. The use of a UAV will allow us to provide analysis, monitoring and reporting of geographic data captured via remote sensing from this small platform rather than from fixed wing aircraft.

2. 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 one or two lithium polymer batteries, depending on duration needed, 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 1 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 National Airspace System (NAS).

For additional information on the E384, reference Appendix A (E384 Operations Manual) and Appendix B (E384 Maintenance Manual), which specify manufacturing

information, aircraft performance, operating limits, normal and emergency procedures, fail-safe features, and maintenance and inspection procedures.

C. Statutory Authority

1. 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 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.

2. How JRJ meets the criteria laid forth in Section 333

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

a. 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 will pose little hazard to people or structures on the ground, thus making it an exponentially safer alternative to manned, fixed wing aircraft for aerial imaging.

b. Operational Capability

The primary function of the E384 is to provide aerial imagery using one of two interchangeable geo-reference capable still cameras. High resolution data generated from these cameras offer a wide range of applications through analysis, such as 3D models for quarry pile quantities, orthophotos for progress comparisons and topographic maps with contours and ground features for planning purposes. The use of the UAV removes personnel from close proximity to heavy equipment and from potential fall hazards.

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 mapping zone. 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 data link is detected at any time the E384 will immediately execute a return-to-launch sequence (Reference Appendix A). 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.

c. <u>Proximity to Airports/Populated Areas</u>

Grant of the exemption to JRJ will be subject to the following mandatory conditions, which are based upon operating conditions set forth for operation of UAS by public entities pursuant to Certificates of Authorization, with additional restrictions:

- All operations to occur in Class G airspace.
- Operations to avoid congested or populated areas, which are depicted in yellow on VFR charts.
- Operations to be conducted over private or controlled-access property.
- Permission from land owner/controller required before commencing any flight.
- Operations to occur during Visual Flight Rules Meteorological Conditions (VMC).
- Aircraft to remain within Visual Line of Sight (VLOS).
    - VLOS guaranteed with a cylinder of operation around operator of ½ nautical miles (NM).
    - Cylinder walls may be expanded by observer with ability to control aircraft.

- Operations to occur during daylight hours.
- Above Ground Level (AGL) altitude to be restricted to 400 feet.
- All operations conducted in vicinity of airport to remain more than 2.5 NM from centerline azimuth of runway centerline measured from runway thresholds.
- Operator will file a NOTAM for each flight.
- All required permissions and permits will be obtained from territorial, state, county or city jurisdictions, including local law enforcement, fire, or other appropriate governmental agencies.

d. 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 (and the Safety Observer positioned next to the PIC) at an altitude 400 ft. AGL or less. The Safety Observer will be responsible for ensuring that the E384 remains within VLOS at all times and will also assist in spotting potential hazards.

3. Other Relevant Factors

a. Operational Limitations

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

- E384 flights are only permitted over designated sites
- The E384 will operate at or below 400 ft. AGL

- The E384 will operate within 1 NM and within VLOS of the PIC and Safety Observer
- The Safety Observer will be located next to the PIC and will ensure the aircraft remains within VLOS and assist in spotting potential hazards
- The E384 will operate in accordance with Day Visual Flight Rules and only in Visual Meteorological Conditions during daylight hours
- 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 A)
- E384 flights will avoid direct overflight of any office or maintenance buildings located on-site
- All employees working on-site will be thoroughly briefed on E384 operations prior to operations commencing
- E384 operations will be conducted by pilots who have, at a minimum, a private pilot certificate and have completed Event 38's Training Program (Reference Appendix C)
- 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 Safety Observer 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 theE384 Maintenance Manual (Reference Appendix B)
- 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

JRJ will be bound by these limitations for commercial flights after FAA approval of the exemptions laid forth in this petition. JRJ 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.

D. Basis for Petition

1. Name and Address of the Petitioner

John R Jurgensen, Company

11641 Mosteller Road

Cincinnati, Ohio 45241

Phone: 513-490-3409

Email: jim.knuckey@jrjnet.com

2. Specific Sections of 14 CFR from which JRJ Seeks Exemption

Below are the sections from which JRJ seeks exemption, with specifics on the extent of relief sought, reason for relief, and why exemption would not adversely affect safety.

a. Part 21 Subpart H – Airworthiness Certification

Part 21 Subpart H establishes the requirements for the issuance of an airworthiness certificate. JRJ seeks complete exemption from Part 21 Subpart H pursuant with Section 333, which authorizes the FAA to exempt a UAS from the requirements of an airworthiness certificate based on consideration of the following: size, weight, speed, operational capability, proximity to airports and populated areas, and operation within VLOS.

An equal level of safety will be achieved with the operational limitations established in this document (Reference A.3.a) for all JRJ E384 flights. Specifically that all flights will occur within VLOS of the PIC and Safety Observer, at an altitude of 400 ft. AGL or less, and only over designated areas. As a result the E384 can safely operate without creating a hazard to any other aircraft, people, or structures on the ground. The combination of the E384's safe operational history overseas and small, lightweight airframe, in conjunction with JRJ's pilot requirements and operating limitations result in a safer alternative for aerial imagery collection.

b. 45.23 (b) – Marking Requirements

45.23 (b) requires aircraft to display the roman capital letter "N" with registration number and the words "restricted", "light-sport", "experimental", or

"provisional", as applicable, on the entrance to the cabin, cockpit, or pilot station in lettering that is between 2 in. and 6 in. in height. The E384 is unmanned and thus has no cabin, cockpit, pilot station, or entrance on which these required markings could be displayed. JRJ, will to the maximum extent possible, comply with the location requirements of 45.27 (a) and the size requirements of 45.29 (f). JRJ specifically proposes to put the "N" number and the word "EXPERIMENTAL" in the largest lettering possible on the fuselage of the aircraft in accordance with 45.29 (f) "if no surface authorized to be marked by 45.27 is large enough for full-size marks, marks as large as practicable must be placed on the largest of the authorized surfaces".

JRJ also proposes placing a flag at the ground control station with the words "EXPERIMENTAL UAS" in 3 in. lettering. An equal level of safety would be maintained by displaying the word "EXPERIMENTAL" on the fuselage of the aircraft and by placing a flag at the ground control station with the words "EXPERIMENTAL UAS". Since the E384 will always be within VLOS of the PIC (positioned at the ground control station) and flown at a low altitude (400 ft. AGL or less) the markings on the airframe and the flag located at the ground control station would allow all parties to visually be informed of the UAS' operating status.

c. <u>91.7 (a) – Civil Aircraft Airworthiness</u>

91.7 (a) states that "no person may operate a civil aircraft unless it is in an airworthy condition". JRJ is already seeking exemption for airworthiness Certification (Reference D.2.a.) and thus no FAA standard will exist for

determining airworthiness. As a result JRJ seeks full exemption from this regulation.

JRJ will achieve an equal level of safety by using E384 Operations Manual and Maintenance Manual (Appendix A and B) which contain pre-flight protocol for each flight, safety checks, and comprehensive maintenance procedures. In addition the E384 has already demonstrated the ability to fly safely in the NAS at the Cleveland Airshow, and thus is airworthy.

d. <u>91.9 (b) – Civil Aircraft Flight Manual in the Aircraft</u>

91.9 (b) states that no person may operate an aircraft unless there is a current approved flight manual for the aircraft onboard. The E384's small and lightweight airframe is not physically capable of carrying an aircraft flight manual onboard. In addition to this the E384 is unmanned, and the PIC is located at the ground control station. JRJ thus seeks exemption from the requirement to carry the aircraft flight manual onboard. JRJ instead proposes that the E384 Operations Manual (Reference Appendix A), which contains information normally found in an aircraft flight manual, be kept at the ground control station where is readily assessable to the PIC and Safety Observer for reference.

If it were physically possible for these required documents to be placed onboard the aircraft, the PIC and Safety Observer would have no means of accessing the information due to the fact that E384 is unmanned with no aircrew onboard. Therefore an equal level of safety will be meet by keeping the E384 Operations Manual at the ground control station where it will be readily accessible

(within arm's reach) to the PIC who is operating the aircraft, thus meeting the intent of the regulation.

e. <u>91.103 – Preflight Action</u>

91.103 requires that the PIC be familiar with specific information before each flight such as weather, forecast, and fuel requirements. In addition to this the PIC must be familiar with information found within the approved flight manual relating to aircraft performance and take-off and landing distances. Due to the fact that the E384 has no FAA-approved flight manual JRJ seeks exemption from this regulation. JRJ proposes to use the E384 Operations Manual (Reference Appendix A) in lieu of an FAA-approved flight manual. This publication has extensive pre-flight checklists that include reviewing weather, battery requirements, take-off and landing distances, and aircraft performance data.

The information found in the E384 Operations Manual is comparable to the information found in a FAA-approved flight manual, to include a comprehensive step-by-step pre-flight checklist. As a result an equal level of safety will be maintained by the PIC using this publication, which addresses the items listed in 91.103.

f. <u>91.109 – Flight Instruction</u>

91.109 states that "no person may operate a civil aircraft that is being used for flight instruction unless that aircraft has fully functioning dual controls". The E384 is operated by the PIC through a ground control station that communicates with the aircraft via line of sight (LOS) transmissions. The E384 by design does

not have fully functioning dual controls and as a result JRJ seeks exemption from this regulation.

Exemption from this regulation requiring dual controls will not create a safety hazard because the E384 is unmanned and does not carry a pilot or passengers on board. In addition the E384's small size and foam airframe is significantly less hazardous to persons and structures on the ground than a manned, fixed-wing aircraft. Because the E384 ground control station consist of a RX9 controller and PC computer, it will be accessible to both the Instructor and Student at all times. The "controls" can in essence be passed back and forth between the Instructor and Student, achieving an equivalent level of safety as having two sets of controls.

g. <u>91.119 – Minimum Safe Altitude</u>

91.119 establishes the minimum altitude that civil aircraft may safely operate at. 91.119 (c) specifically states that over "other than congested areas" a civil aircraft cannot operate below an "altitude of 500 feet above the surface, except over open water or sparsely populated areas *(and)* in those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure". The sole function of the E384 is to fly at low altitudes over mapping zones, which can be categorized as "other than congested areas". Small UAS', like the E384, by design are typically flown at altitudes of less than 500 ft. AGL and in close proximity to the PIC and Safety Observer to maintain VLOS. JRJ has

established operating limitations to achieve the highest level of safety, specifically that the E384 will not operate above 400 ft. AGL and that the E384 will remain within VLOS of the PIC and Safety Observer. For these reasons JRJ seeks exemption from this regulation.

An equivalent level of safety will be maintained by only operating the E384 over designated sites (Reference 3.C.b). In addition the E384's small size and foam airframe is significantly less hazardous to persons and structures on the ground than a manned, fixed-wing aircraft providing the same service. Also by operating at an altitude of 400 ft. AGL or less the E384 will be laterally separated from manned aircraft that are subject to this minimum safe altitude regulation and thus an equal if not greater level of safety will be maintained.

h. <u>91.121 – Altimeter Settings</u>

91.121 requires aircraft to maintain a cruising level or flight level in reference to a current reported altimeter setting. The E384 is not equipped with a programmable altimeter but rather determines location and altitude via an onboard GPS. Also since the E384 will be operating at or below 400 ft. AGL, there is no need to maintain hemispherical cruising altitudes for de-confliction with manned aircraft. For these reasons JRJ seeks exemption from this regulation.

An equal level of safety will be achieved through the E384's GPS, which provides altitude and location data to the PIC via the ground control station. The E384 Operations Manual specifically addresses checking the GPS read-out to ensure that it's within tolerance prior to commencing flight operations. This,

combined with the fact that the aircraft's altitude will be visually monitored by the PIC and Safety Observer, ensures an equal level of safety is attained in lieu of referencing an altimeter setting. Furthermore by operating at or below 400 ft. AGL the E384 will not create a hazard to any manned aircraft maintaining hemispheric cruising altitudes based on a current altimeter setting.

i. <u>91.151 (a) – Fuel Requirements for Flight in VFR Conditions</u>

91.151 (a) states that no person may begin a flight in Day VFR conditions unless there is enough fuel to fly to the intended landing point and fly for 30 minutes after that point is reached. The E384 is battery operated and does not carry fuel. It has a maximum flight time of 100 minutes on fully charged batteries. Compliance with the regulation would leave the E384 with 70 minutes of flight time. 70 minutes of flight time would be sufficient enough to accomplish the task of imaging the designate mapping zone but this restriction is not necessary due to the fact E384 has the ability to land anywhere. Therefore JRJ seeks full exemption from this regulation because the risk or danger associated with failing to reach a safe landing point with 30 minutes of extra "fuel" does not exist. The E384 does not have to return to a "landing point" but rather can be safely put down within the mapping zone.

An equal level of safety will be maintained simply by the fact that the E384 is designed to safely land within the mapping zone in the event that the battery is exhausted. Any risk associated with battery duration (fuel) in relationship to flight time is mitigated by the fact that E384 has the ability to land anywhere and at any given time.

j. 91.203 (a) & (b) – Civil Aircraft: Certifications Requirements

91.203 requires all civil aircraft to have "within it…an appropriate and current airworthiness certificate" that must be "displayed at the cabin or cockpit entrance so that is legible to passengers or crew". JRJ is already seeking exemption from the airworthiness certificate regulation and thus requires an exemption from this regulation. In addition the E384 due to its size and design has no cabin or cockpit and therefore does not have the ability to affix or carry certification or registration documents. Furthermore the E384 does not carry any passengers or crew for whom the certificate is required to be displayed. JRJ proposes that any FAA-required documents be kept at the ground control station and that a small placard be affixed to the E384 airframe with manufacture, registration, and contact information.

An equal level of safety will be achieved by having any FAA required documents located at the ground control station where it will be readily accessible to the PIC and any other agencies that may require the information. Having a placard attached to the E384 airframe will also allow any person or agencies to be informed of the UAS' origin and status.

k. Part 91 Subpart E (91.401-91.417) – Maintenance, Preventative Maintenance, and Alterations

These regulations provided the maintenance and inspections requirements in reference to Part 39 and Part 43. 91.405 (a) specifically states that "no person may perform maintenance, preventive maintenance, and alterations on an aircraft other than as prescribed in this subpart and other applicable regulations, including

part 43 of this chapter". JRJ seeks full exemption from these regulations due to the fact that these sections apply to an aircraft with an airworthiness certificate for which JRJ is already seeking exemption.

An equal level of safety will be achieved by using the E384 Operations Manual (Reference Appendix A) and E384 Maintenance Manual (Reference Appendix B) which provide step-by-step instructions on regular and corrective maintenance. The PIC will be responsible for conducting maintenance in accordance with these procedures. Any E384 maintenance that is not covered in these procedures will be performed by the manufacturer. JRJ will ensure that all maintenance performed on the E384 by the PIC and manufacturer is documented in accordance with 91.407 (a) (1). Specifically that the records will include "a description of the work performed; and the date of completion of the work performed; and the signature…of the person approving the aircraft for return to service". The PIC will authorize the E384 for return to service for all maintenance covered in the E384 Operations Manual and Maintenance Manual and the manufacturer will authorize the E384 for return to service for all maintenance that is outside the scope of these two documents. JRJ will also ensure that no modifications or alterations are made to the airframe that affect the flight operating characteristics of the E384.

3. <u>How request benefits public as a whole</u>

The E384 is a safe, efficient, and an economical alternative to manned, fixed wing aircraft that are currently being used to conduct aerial imaging of mapping zones. There are a three major reasons why the public would benefit from granting JRJ exemptions

from these regulations. Authorizing E384 flights over designated sites would 1) reduce the number of manned aircraft in the NAS, 2) reduce air and noise pollution and 3) reduce the risk to life and property on the ground. Utilizing the E384 in lieu of a traditional manned, fixed wing aircraft will result in the overall reduction of manned aircraft in the NAS. Thus there will be less aircraft that require control and coordination with Air Traffic Controllers (ATC). Because the E384 can take-off and land on-site and operate at an altitude of 400 ft. AGL (or less) within VLOS of the PIC there is no need for ATC to provide coordination during ground, takeoff, departure, transit, arrival, and landing phases of flight. As the skies over the United States get busier and busier, any small effort to lighten the load of the Air Traffic Controllers would be of great benefit to the public.

At 5.9 lbs. the battery operated E384 with an electric motor provides a much quieter alternative to manned, fixed-wing aircraft. Traditionally a manned aircraft would have to transit from the departure airport to the desired site and fly at low altitudes to achieve high-resolution imagery. The E384 will require no transit time, and the electric motor will be exponentially quieter than a twin-engine combustion motor on passenger aircraft that is typically used to conduct aerial imaging. In addition the E384 requires no fuel since it is battery operated. A manned aircraft on the other hand typically burns 2030 gallons of aviation fuel per hour which is polluting the air not only over the site but over the path of transit and around the airport. Conducting aerial imaging with the E384 in lieu of a manned aircraft would thus greatly reduce both air pollution and noise pollution which is of great benefit to the public.

Using the E384 would also greatly reduce if not completely eliminate the risk to life and property on the ground. The E384's incredibly small size, reduced weight, and foam airframe pose no hazard to people or structures on the ground as opposed to a manned twin engine-passenger aircraft which has a much greater potential for collateral damage. In addition the E384 is unmanned and as a result the risk associated with piloting this aircraft is non-existent. Overall the E384 provides a much safer alternative to manned, fixed-wing aircraft operations for the purpose of collecting aerial imagery.

4. Additional information, views, and arguments

The following documents have been included as Appendices to this Petition. Appendix A, B, and C have been submitted confidentially for proprietary reasons and will not be available to the public.

- E384 Operations Manual (Appendix A)
- E384 Maintenance Manual (Appendix B)
- Event 38 Training Syllabus (Appendix C)

5. Summary for Federal Register

Pursuant with Section 333 of the FAA Modernization and Reform Act of 2012, John R Jurgensen, Company requests exemption from the following Federal Aviation Regulations that are found under Title 14 of the Code of Federal Regulations: Part 21 Subpart H, 45.23 (b), 91.7 (a), 91.9 (b), 91.103, 91.109, 91.119, 91.121, 91.151 (a), 91.203 (a) (b), Part 91 Subpart E (91.401-91.417). Exemption from these regulations would allow John R Jurgensen, Company to operate the E384 Unmanned Aerial System over quarries and construction sites for the purpose of providing high-resolution aerial imagery of mapping zones.