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

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

May 29, 2015

Exemption No. 11711
Regulatory Docket No. FAA–2015–0777

Mr. Robert Hanson
Senior Vice President
Michael Baker International, LLC
4431 North Front Street, Second Floor
Harrisburg, PA 17110

Dear Mr. Hanson:

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 19 and April 30, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Michael Baker International, LLC (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial photography for aerial mapping (photogrammetry) and video documentation.

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 Precision Hawk Lancaster III, DJI Phantom 2 Vision+, DJI Phantom 3, and DJI Inspire 1.

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. 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, Michael Baker International, 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, Michael Baker International, 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 Precision Hawk Lancaster III, DJI Phantom 2 Vision+, DJI Phantom 3, and DJI Inspire 1 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

March 19, 2015

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

Submitted Electronically via the Federal Docket Management System (FDMS)

Re: Exemption Request under Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations

Dear Sir or Madam:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the "Reform Act") and 14 C.F.R. Part 11, Michael Baker International (MBI) seeks an exemption from Federal Aviation Regulations ("FARs") detailed below for the following described Unmanned Aerial System called in this application the MBI System, which includes an Unmanned Aircraft (UA) and ground station-based equipment and crew:

This application incorporates by reference those confidential manuals and materials filed by PrecisionHawk, Inc. ("PrecisionHawk") in connection with its petition for an exemption under Section 333 of the FAA Modernization and Reform Act of 2012 ("FMRA") to allow commercial operations of unmanned aircraft for precision aerial survey. PrecisionHawk requested confidential treatment of those materials under the trade secrets and proprietary business information exemption of the Freedom of Information Act ("FOIA"). (See 5 U.S.C. § 552(b)(4).)

THE UNMANNED AIRCRAFT (UA):

- A Precision Hawk Lancaster III lightweight (3lb. gross weight), battery operated fixed wing aircraft that is hand launched.
- An on-board flight computer with GPS navigation and location ability that receives signals for flight controls from a ground-based transmitter/controller;
- An on-board camera capable of capturing imagery in the form of full color, high definition still photos and video
- An on-board telemetry system that delivers flight data from the on-board flight computer to the on-board radio transmitter including altitude AGL, horizontal and vertical speed, compass direction of flight and direction back to its launch site

THE GROUND STATION-BASED PART OF THE SYSTEM:

- A Pilot in Command (PIC) in operational control of a flight operation from beginning to end and who controls the UA while in the air
- A radio transmitter/controller operated by the PIC to control the UA while in flight
- Ground Station which receives real time system telemetry from the UA
- A Visual Observer (VO) is a person who provides a second pair of eyes to visually track the UA while in flight.

The requested exemption will support an application for a commercial Certificate of Authorization to use the above described MBI System to support aerial photography for aerial mapping (photogrammetry) and video documentation for the public good. Typical applications would include: new and existing construction, transportation and utilities, land development, environmental mitigation projects and so forth.

The UA, powered by batteries, is smaller, lighter and more maneuverable than larger aircraft running on combustible fuel; it operates at lower altitudes (under 500') with no people on board thereby reducing current risk levels and enhancing public safety. With a small payload and maximum flight time of approximately 45 minutes, this offers little or no risk to national security.

Low level photography is far more effective than ground based imagery for displaying the characteristics of large, complex properties with ongoing construction, or transportation and/or utility corridors. The applicants as a routine part of their business have contracted both Helicopter and Fixed wing aircraft for this type of work. However, especially in the case of small projects or projects, manned aircraft prove too costly or unable to acquire data at low enough speeds or altitude to meet these requirements. The benefits of reduced cost and improved quality from the UA will be valuable to and benefit many users of this aerial data.

Additionally, MBI has been a contractor to FEMA for 35 consecutive years where we are often called in to support first responders, including fire fighters, the police, the sheriff, et al., MBI believes the use of UA can contribute to this effort safely while remaining subject to all limitations cited in this application.

The MBI System will be operated in the field with both a PIC and a VO in accordance with FAA Policy N 8900.227 Section 14 "Operational Requirements for UAS" and with the following Restrictions:

(a) No flight will be made with a UA Gross weight exceeding 55 pounds;
(b) All operations must occur in FAA Class G airspace at no more than 500' AGL, at an airspeed of no more than 25 knots and no further than 3/4 NM from the PIC;
(c) All operations must utilize a visual observer (VO). The VO and PIC must be able to communicate verbally at all times during a flight operation;
(d) In the event of operations over private property, every effort will be made to notify and gain permission of the property owner;
(e) The PIC must have accumulated and logged, in a manner consistent with 14 CFR § 61.51 (b), a minimum 10 hours of total time as a UA pilot and at least 5 hours logged as a UA pilot with a similar UA type;
(f) All required permits will be obtained from state and local government prior to operation;
(g) The MBI System will not be operated over densely populated areas without prior approval;
(h) The MBI System will not be operated at air shows;
(i) The MBI System will not be operated over any open-air assembly of people, without prior approval;
(j) The MBI System will not be operated over heavily trafficked roads without prior approval;
(k) The MBI System will not be operated within 5 NM of an airport or heliport without prior approval;
(l) The MBI System will be restricted to day operations and weather conditions equivalent to VFR;
(m) The PIC will brief the VO and property owner about and any potential risk before operation;
(n) No flight may be made without a successful Pre-Flight Inspection by the PIC before each operation to ascertain that the UA is in a condition safe for flight;

The PIC and VO will meet the requirements outlined in FAA Policy N 8900.227 Section 16 Personnel Qualifications. Additionally, the PIC and VO will perform maintenance on the system and will complete a course of maintenance instruction as part of their initial training.

We submit that the combination of the UA's light weight, flight performance and ability, fully qualified flight crew and strict operation under the guidelines established in 8900.227, and under all of the Restrictions (a) through (n) listed above, the FAA can have full confidence that the operation will have an equivalent or greater level of safety than manned aircraft performing the same mission.

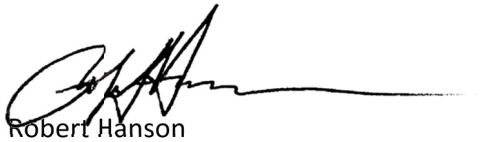
The name and contact information of the applicant is:

Michael Baker International, LLC.
Attn: Robert Hanson
Ph: 717-221-2005
Email: rhanson@mbakerintl.com

The regulations from which the exemption is requested are listed below. Beside each regulation number is the page of the attached Addendum upon which each may be found together with our proposed equivalent level of safety for each regulation:

We are prepared to modify or amend any part of this request to satisfy the need for an equivalent level of safety. Please contact us at any time if you require additional information or clarification. We look forward to working with your office.

Sincerely,



Robert Hanson
Senior Vice President GIT
Michael Baker International, LLC.
Phone: 717-221-2005

Addendum containing Exemption Requests and Equivalent Level of Safety
Appendix A – Flight Operations/Procedures
Appendix B – Operators Manual (PRECISION HAWK LANCESTER III)

ADDENDUM

EXEMPTION REQUESTS AND EQUIVALENT LEVEL OF SAFETY

Michael Baker International, LLC, requests an exemption from the following regulations as well as any additional regulations that may technically apply to the operation of the MBI System:

14 C.F.R. Part 21, Subpart H: Airworthiness Certificates 14 C.F.R. 91.203 (a) (1)

Subpart H, entitled Airworthiness Certificates, establishes the procedural requirements for the issuance of airworthiness certificates as required by FAR 91.203(a) (1). Given the size and limited operating area associated with the UA to be utilized by the Petitioner, an exemption from Part 21 Subpart H meets the requirements of an equivalent level of safety under Part 11 and Section 333 of the FMRA. The Federal Aviation Act (49 U.S.C.44701 (f)) and Section 333 of the FMRA both authorize the FAA to exempt aircraft from the requirement for an airworthiness certificate, upon consideration of the size, weight, speed, operational capability, and proximity to airports and populated areas of the particular UA. In all cases, an analysis of these criteria demonstrates that the UA operated without an airworthiness certificate, in the restricted environment and under the conditions proposed will be at least as safe, or safer, than a conventional aircraft (fixed wing or rotorcraft) operating with an airworthiness certificate without the restrictions and conditions proposed. The UA to be operated hereunder is less than 55 lbs. fully loaded, is by definition unmanned and carries neither a pilot nor passenger, carries no explosive materials or flammable liquid fuels, and operates exclusively within a limited flight area. Unlike other civil aircraft, operations under this exemption will be tightly controlled and monitored by the Operator and will also remain within the requirements of, and in compliance with, local public safety requirements. These safety enhancements, which already apply to civil aircraft provide a greater degree of safety to the public and property owners than conventional operations conducted with airworthiness certificates issued under 14 C.F.R. Part 21, Subpart H. Lastly, application of these same criteria demonstrates that there is no credible threat to national security posed by the UA due to its size, speed of operation, location of operation, lack of explosive materials or flammable liquid fuels, and inability to carry a substantial external load.

14 C.F.R. 45.23 (b). Marking of the Aircraft

The regulation requires; When marks include only the Roman capital letter "N" and the registration number is displayed on limited, restricted or light-sport category aircraft or experimental or provisionally certificated aircraft, the operator must also display on that aircraft near each entrance to the cabin, cockpit, or pilot station, in letters not less than 2 inches nor more than 6 inches high, the words "limited," "restricted," "light-sport," "experimental," or "provisional," as applicable. Even though the UA will have no airworthiness certificate, an exemption may be needed as the UA will have no entrance to the cabin, cockpit or pilot station on which the word "Experimental" can be placed. Given the size of the UA, two-inch lettering will be impossible. The word "Experimental" will be placed on the fuselage in compliance with 45.29 (f). The equivalent level of safety will be provided by having the UA marked on its fuselage as required by 45.29 (f) where the pilot, observer and others working with the UA will see the identification of the UA as "Experimental."

The FAA has issued the following exemptions to this regulation to Exemptions Nos. 10700, 8738, 10167 and 10167 A.

14 C.F.R. 91.7(a): Civil aircraft airworthiness.
The regulation requires that no person may operate a civil aircraft unless it is in airworthy condition. As there will be no airworthiness certificate issued for the aircraft, should this exemption be granted, no FAA regulatory standard will exist for determining airworthiness. Given the size of the aircraft and the requirements contained herein for the use of safety check lists prior to each flight, an equivalent level of safety will be provided.

14 CFR 91.9 Civil aircraft flight manual, marking, and placard requirements.
This regulation provides that no person may operate an aircraft unless a current, approved flight manual is in the aircraft. We assume that the intent of this requirement is to ensure that flight manual information is available to the aircrew while operating the aircraft. We request an exemption to this requirement since the aircraft is not only too small to carry documentation; the documentation would not be available to the crew during flight operations.

To obtain an equivalent level of safety and meet the intent of 91.9, we propose that a current, approved UA Flight Operations/Procedures (Appendix A) must be available to the crew at the ground station anytime the aircraft is in, or preparing for, flight.

The FAA has issued the following exemptions to this regulation: Exemption Nos. 8607, 8737, 8738, 9299, 9299A, 9565, 95658, 10167, 10167A, 10602, 32827, and 10700.

14 CFR 61.113 Private pilot privileges and limitations: Pilot in Command and 61.133 Commercial pilot privileges and limitations.
The regulation provides that no person that holds a private pilot certificate may act as pilot in command of an aircraft for compensation or hire. Subparagraph (b) allows a private pilot to act as pilot in command of an aircraft in connection with any business or employment if: (1) The flight is only incidental to that business or employment; and (2) The aircraft does not carry passengers or property for compensation or hire.

Our proposed operations require that the PIC must either

1. Hold a Private Pilot Certificate issued by the FAA, and have logged 10 hours of flight experience in this type of UA, or
2. Meet the requirements of 8900.227 para 16(c)(2)(c) "Operations without a pilot certificate" in which the PIC is required to complete "FAA private pilot ground instruction" and pass "the FAA Private Pilot written examination." Since there are currently no means available for the pilot of a UA to gain the experience in an equivalent category and class in order to apply for a private pilot's license, we propose to generate an equivalent level of safety by requiring our pilots to complete, at a minimum, FAA private pilot ground instruction and pass the FAA Private Pilot written examination in addition to completing the private pilot requirements. Since the aircraft cannot carry passengers or property, we feel that we meet the intent of 61.113 Subparagraph (b) even though the intent of this application is to conduct a business.

14 CFR 91.109 Flight Instruction; Simulated instrument flight and certain flight tests
The regulation 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 MBI System ground-based control station consists of a small hand-held radio transmitter and while it does not offer a second set of "controls", both the student and instructor can, and will, operate the single set of controls simultaneously. With both student and instructor having "hands-on" the controls during flight, we feel that this technique meets the intent 91.109 and provides an equivalent level of safety.

14 CFR 91.119 Minimum safe altitudes: General.
The regulation states that over sparsely populated areas the aircraft cannot be operated closer than 500 feet to any person, vessel, vehicle, or structure. Since the aircraft will be operating at a maximum of 500 feet AGL, we cannot comply with this requirement.

In order to provide an equivalent level of safety The UA will not be operated over congested areas or over any open air assembly of persons with prior approval. Any property owner affected will be briefed on the expected route of flight and the associated risks to persons and property on the ground. The aircraft will be operated at a low altitude allowing, if a power unit fails, an emergency landing without undue hazard to persons or property on the surface. Therefore we maintain that due to the small size of the UA, the hazard to persons, vehicles and structures is minimal compared to manned aircraft, which should be considered in granting the exemption.

14 CFR 91.121 Altimeter settings.
The regulation requires that aircraft shall maintain cruising altitudes by reference to an altimeter setting available within 100 NM of the aircraft.

The UA will always fly below 500 feet AGL and will not need to maintain cruising altitudes in order to prevent conflict with other aircraft. An Above Ground Level altimeter measurement above the takeoff point is transmitted via radio from the UA on-board computer to the display screen held by the PIC, providing a constantly updated AGL readout.

14 CFR 91.151 Fuel requirements for flight in VFR conditions.
The regulation provides that no person may begin a flight in an airplane under day-VFR conditions unless there is enough fuel to fly to the first point of intended landing and to fly after that for at least 30 minutes.

The intention of this paragraph is to provide an energy reserve as a safety buffer for delays to landing. The UA is battery operated and the maximum duration of flight from a single battery charge is 45 minutes with a 20% reserve. Since the aircraft will never fly more than 3/4NM from the point of intended landing, a full battery charge at launch will ensure that we meet the reserve energy requirement of this paragraph. We request an exemption to the word "fuel" and ask for an equivalent interpretation with the word "energy".

14 CFR Subpart E (91.401 - 91.417) - Maintenance, Preventive Maintenance, Alterations
The regulation provides that the operator is primarily responsible for maintaining the aircraft in an airworthy condition, including compliance with part 39 and 43. Paragraphs 91.407 and 91.409 require that the aircraft be "approved for return to service by a person authorized under 43.7" after maintenance and inspection.

It is our intention that the PIC perform maintenance and inspection of the aircraft and "be authorized to approve the aircraft for return to service." As provided in the Pre-Flight Checklist in Appendix A, the PIC will ensure that the aircraft is in an airworthy condition prior to every flight and in addition conduct detailed inspections after every two hours of flight. Maintenance performed by the PIC is limited to repairing small cracks, replacing a propeller, checking electrical connections and updating software and firmware for the on-board computer. All other maintenance will be performed by the manufacturer or their designated repair facility. The PIC will document work performed in accordance with 91.417. We feel that due to the size, construction, and simplicity of the aircraft, the PIC can ensure an equivalent level of safety.

8900.227 Paragraph 16(c)(4) PIC Medical. and Paragraph 16(e)(1) Observer Medical.
This policy provides that both the PIC and VO must have a valid FAA second-class medical certificate issued under part 67 in order to perform as a pilot or observer.

The UA maximum gross weight is 3lbs., it is constructed of foam, plastic and carbon fiber. The PIC is not on board. Both the PIC and the VO are required to be in VLOS. Given the unlikely event that both the PIC and VO become medically incapacitated while the aircraft is in flight, the UA will return autonomously to the site of launching and land without crew intervention. Therefore, requiring the PIC and VO to meet the same medical requirements as commercial pilot carrying passengers in a large aircraft is an unnecessary burden.

We propose that the minimum medical requirements for the PIC and VO be vision corrected to 20/20 and a valid, state issued driver's license. The 20/20 vision requirement will ensure that the PIC and VO n see and avoid air traffic; a licensed driver is medically qualified to operate a much larger vehicle.

APPENDIX A – FLIGHT OPERATIONS/PROCEDURES

FLIGHT RESTRICTIONS

(a) No flight will be made with a UA Gross weight exceeding 55 pounds;
(b) All operations must occur in FAA Class G airspace at no more than 500' AGL, at an airspeed of no more than 25 knots and no further than 3/4 NM from the PIC;
(c) All operations must utilize a visual observer (VO). The VO and PIC must be able to communicate verbally at all times during a flight operation;
(d) In the event of operations over private property, every effort will be made to notify and gain permission of the property owner;
(e) The PIC must have accumulated and logged, in a manner consistent with 14 CFR § 61.51 (b), a minimum 10 hours of total time as a UA pilot and at least 5 hours logged as a UA pilot with a similar UA type;
(f) All required permits will be obtained from state and local government prior to operation;
(g) The MBI System will not be operated over densely populated areas without prior approval;
(h) The MBI System will not be operated at air shows;
(i) The MBI System will not be operated over any open-air assembly of people, without prior approval;
(j) The MBI System will not be operated over heavily trafficked roads without prior approval;
(k) The MBI System will not be operated within 5 NM of an airport or heliport without prior approval;
(l) The MBI System will be restricted to day operations and weather conditions equivalent to VFR;
(m) The PIC will brief the VO and property owner about and any potential risk before operation;
(n) No flight may be made without a successful Pre-Flight Inspection by the PIC before each operation to ascertain that the UA is in a condition safe for flight;

PRE-FLIGHT CHECKLIST

1. Ensure aircraft has been assembled successfully following the operator manual
2. Payload of choice has been mounted in the payload bay
3. Aircraft is powered up and placed where it should land
4. When ready, select the flight plan via the LCD screen located on the aircraft, just behind the wings
5. Press the 'OK to launch' button on the aircraft. The plane will automatically start its diagnostics check.
6. Refer to the corresponding indicator lights and LCD screen to determine current status. Once the aircraft has gone through most of the startup sequence, you'll have to blow into the Pitot tube to confirm proper connection. The aircraft is now ready to fly.

MISSION PLANNING CHECKLIST

1. Set the aircraft aside and focus attention on the computer.
2. Review the survey area, (step 23 in the operator manual), by downloading the flight plan out of the aircraft.
3. Open up the Mission Planner application and navigate to the Flight Plan tab.
4. Next, review or update what mission has been planned: click Read WPs, to extract the waypoints that the plane wants to fly.
5. Confirm the area is properly selected. If any changes need to be made to the flight or the

landing position, do so within this step.

6. (Step 24 in the operator manual) The operator needs to allow for a safe buffer room for landing. This can be done by walking the aircraft to an area or corridor that is free of obstructions. Ideally, the aircraft needs a clear approach path of greater than 250 meters, with obstacles not interfering with the glide slope from a 40 meter approach altitude.
7. To edit the survey boundary, prior to flight, drag the survey points to highlight the area of interest.
8. Upload the new configuration by clicking Write WPs (step 24 in the operator manual).

LAUNCH CHECKLIST

1. Remove the lens cap from the sensor and press the 'OK to launch' button. The aircraft will give you approximately five seconds before it starts the motor. Once the motor goes to full speed, you are ready to launch the aircraft by throwing it into the air.

    a. After pressing OK launch button starting the motor you can abort the sequence and stop the motor at any time. Simply press any arrow keys and the motor will immediately stop and disarm.

2. The aircraft doesn't have to be thrown upward. The easiest thing will be to throw it straight and it will climb the altitude by itself. It is always better to throw the aircraft into the wind.

3. Once the aircraft is launched, it will climb up to 40 m to takeoff loiter position (way point 2). Here it will make series of circles to determine the weather conditions. Taking into account environmental conditions, survey parameters and bounds of the field, it will automatically adjust the flight plan and landing loiter point as needed, landing into the wind. At this point the PIC should go back to the flight plan and extract the updated mission. Verify the new landing approach path. Make sure that 250 m path, from the second to last Way point (WP) to the landing point (last WP), is free of obstructions. Here the aircraft will decrease altitude from 40 m to 1 m. If path has any obstructions like trees, adjust the second from the last WP to have a free landing path.

4. While aircraft is flying the PIC will monitor the display to keep track of important metrics like altitude, air and ground speed, battery voltage and remaining duration of flight.

5. If needed the PIC can make high level commands to aircraft while in flight. High level commands may be: loiter now, skip WPs or return to previous WP, come home (and loiter over home) and land now.

6. Remote controller can be used by the PIC manually control the flight and landing if required.

APPENDIX B – OPERATORS MANUAL (PRECISION HAWK LANCESTER III)

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Michael Baker
INTERNATIONAL

We Make a Difference

April 30, 2015

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

Submitted Electronically via the Federal Docket Management System (FDMS)

Re: Addendum to Michael Baker International's March 19, 2015 Exemption Request under Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations

Dear Sir or Madam:

Michael Baker International has prepared the following addendum to our Exemption Request filed on March19th. This Addendum allows for the inclusion of Vertical Take-Off and Landing (VTOL) UA's as follows:

- DJI Phantom 2 Vision +
- DJI Phantom 3
- DJI Inspire 1

Operating procedures are different for VTOL/Multi-Rotor aircraft and therefore we include additional procedures in this addendum.

THE UNMANNED AIRCRAFT (UA):

- DJI Models: Phantom 2 Vision +, Phantom 3, and Inspire 1 a lightweight (6.5lb. gross weight and under), battery operated Multi-Rotor VTOL aircraft
- An on-board flight computer with GPS navigation and location ability that receives signals for flight controls from a ground-based transmitter/controller
- An on-board camera attached to the UA via a three axis gimbal, capable of capturing full color, high definition imagery
- An on-board telemetry system that delivers flight data from the on-board flight computer to the on-board radio transmitter including altitude AGL, horizontal and vertical speed, compass direction of flight and direction back to its launch site

THE GROUND STATION-BASED PART OF THE SYSTEM:

- A Pilot in Command (PIC) in operational control of a flight operation from beginning to end and who controls the UA while in the air
- A radio transmitter/controller operated by the PIC to control the UA while in flight

- A Ground Station (Tablet or Smart Phone based App) which receives and displays real time system telemetry and imagery from the UA
- A Visual Observer (VO) is a person who provides a second pair of eyes to visually track the UA while in flight.

This Addendum makes no other changes to the original request including exemptions sought, reasons for exemption request, and/or operating parameters.
The name and contact information of the applicant remains the same:

Sincerely,

Robert Hanson
Senior Vice President
Michael Baker International, LLC.
Phone: 717-221-2005
Email: rhanson@mbakerintl.com

Addendum Adding VTOL UA's
Appendix A – Flight Operations/Procedures
Appendix B – Operators Manuals (DJI Models: Phantom 2 Vision +, Phantom 3, and Inspire 1)

APPENDIX A – FLIGHT OPERATIONS/PROCEDURES

PRE-FLIGHT CHECKLIST

Prior to operation preflight checklists provided by the manufacturer of the UA's will be followed.

1. Remote Controller, Smart Battery, Range Extender and Smartphone are fully charged.
2. Propellers are mounted correctly.
3. Damping absorbers are in good condition, not broken or worn.
4. Camera lens cap has been removed.
5. Micro-SD card has been inserted if necessary.
6. Gimbal is functioning as normal.
7. Motors can start and are functioning as normal.
8. DJI App successfully connects to the UA and camera via Wi-Fi signal.

TAKE OFF/LANDING PROCEDURES

Manufacturer recommended Takeoff and Landing procedures will be followed.

Place the UA on ground with the battery level indicator facing you.

1. Power on the remote controller.
2. Power on the range extender.
3. Switch the camera to the "WIFI ON" position.
4. Power on the aircraft by turning on the intelligent battery
5. Connect the mobile device to the UA, run the DJI App to enter the camera preview page.
6. Wait until the LED flight indicator starts to slowly blink green/yellow. This means the aircraft is initializing and entering the "Ready to Fly"/"Ready to Fly (non-GPS)." state. Then proceed to execute the CSC command to start motors.
7. Push the throttle stick up slowly to lift the aircraft off the ground.
8. When landing, be sure to be hovering over a level surface. Pull down on the throttle stick gently to descend and land.
9. After landing the aircraft on the ground, keep the throttle stick at its lowest position for about 3 to 5 seconds which will automatically stop the motors.

DJI FAILSAFE FUNCTION

The UA will enter Failsafe mode when the connection from the remote controller is lost. The flight control system will automatically control the aircraft; return it to home and land safely. The following situations would make the aircraft fail to receive a signal from the remote controller and enter Failsafe mode:

1. The remote controller is powered off.

2. The aircraft has flown out of the effective communication range of the remote controller.
3. There is an obstacle obstructing the signal between the remote controller and the aircraft, essentially reducing the distance the signal can travel.
4. There is interference causing a signal problem with the remote controller.

APPENDIX B – USERS MANUALS (DJI PHANTOM 2 VISION +, PHANTOM 3, INSPIRE 1)

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