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

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

April 20, 2015

Exemption No. 11392
Regulatory Docket No. FAA–2014–1126

Mr. Thomas Hotard, P.E.
Owner/ Operator
Aerial Intelligence HD, LLC
19257 252nd Avenue
Bettendorf, IA 52722

Dear Mr. Hotard:

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.

**The Basis for Our Decision**

By letter dated December 31, 2014, you petitioned the Federal Aviation Administration (FAA) on behalf of Aerial Intelligence HD, LLC (hereinafter petitioner or operator) for an exemption. The exemption would allow the petitioner to operate an unmanned aircraft system (UAS) to conduct safety inspections and aerial surveying.

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 a Turbo Ace Cinewing 6HL.

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, Aerial Intelligence HD, 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, Aerial Intelligence HD, 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 Turbo Ace Cinewing 6HL 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 April 30, 2017, unless sooner superseded or rescinded.

Sincerely,

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

U.S. Department of Transportation
Docket Management Facility West Building Ground Floor Room W12-140
1200 New Jersey Avenue, S.E.
Washington, D.C. 20590

Dear Sir or Madam:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the Reform Act) and 14 C.P.R. Part 11, Aerial Intelligence HD, LLC ("AIHD, LLC"), hereby applies for an exemption from the listed Federal Aviation Regulations ("FARs"). Aerial Intelligence HD, LLC ("Petitioner") hereby applies for an exemption in order to conduct commercial use operations with unmanned aerial systems ("UAS"). In accordance with the requirements of the Federal Aviation Administration ("FAA"), Petitioner's UAS operations have been designed to achieve a level of safety equivalent to that provided by the FAA regulations from which an exemption is requested.

Attached please find Petitioner's request for an exemption from the listed Federal Aviation Regulations to allow commercial operation of its small Unmanned Aircraft Systems ("sUAS") for aerial imaging for agricultural analysis and rural farm safety and monitoring of secured and controlled environmental areas. The sUAS will be flown exclusively in Class G airspace for this purpose. This exemption request is also exclusively for the use of the *UAS* manufactured by Turbo Ace, Inc. – model Turbo Ace Cinewing 6 HL.

Attached to this letter is the Turbo Ace, Inc. *UAS* Flight Manual ("Manual"), which outlines the operating requirements, limitations, and technical specifications for the Turbo Ace system. Owner/Operator of AIHD, LLC is a licensed, degreed (BSME) Professional Mechanical Engineer and has reviewed this Manual and found it to be acceptable for sUAS operations on its secure project sites.

Thank you for your time and consideration.
Sincerely,

Thomas Hotard, P.E.
Owner/Operator
Aerial Intelligence HD, LLC
19257 252nd Ave
Bettendorf, IA 52722

Cc: John S. Duncan
Director, Flight Standards Service

Congressman: Dave Loebsack

Proposed Commercial Uses

Petitioner proposes to use the Turbo Ace Cinewing 6 HL small UAS aircraft for multiple commercial applications, including safety inspections and aerial surveying of the following remote or difficult-to-access facilities:

- Rural farms with low population density;
- Silos/stacks;
- Grain elevators;
- Pipelines;
- Power lines and cell towers;
- Bridges;
- Wind turbines.

Petitioner also may use UAS operations in support of emergency response activities on behalf of The Department of Agriculture, The Department of the Interior's Bureau of Safety and Environmental Enforcement, and any other federal or state government agency which may require its services and personnel. All of Petitioner's proposed UAS operations are intended to facilitate safety inspections and aerial surveying in areas where the performance of those functions using current methods involves considerable expense and/or a substantial risk of injury. Many of these functions must be performed in hazardous environments by human interaction. Others may be performed much more efficiently with an unmanned aircraft with the ability to hover and capture images at close range. The commercial UAS applications that Petitioner proposes will therefore result in a significant enhancement of safety, by reducing the risks associated with current inspection methods and enhancing current inspection techniques.

Proposed UAS Aircraft

Petitioner plans to conduct commercial UAS operations with the Turbo Ace Cinewing 6 HL aircraft. The Turbo Ace Cinewing 6 HL is a small UAS with a maximum takeoff weight of 20.6 lbs. At all times, while conducting commercial operations, Petitioner will operate the Turbo Ace Cinewing 6 HL under line-of-sight conditions with a hands-on control and in response to commands from a Petitioner employee with specialized flight training. Aircraft will perform commercial operations autonomously or in accordance with a pre-programmed flight plan. If the motors on the aircraft experience a power loss within 20% of empty, the Turbo Ace Cinewing 6 HL has an audible and tactile alarm and failsafe home return system. In the event that the signal between the control system and the Turbo Ace Cinewing 6 HL is lost or disrupted, the aircraft is designed to hover for approximately 5 seconds attempting to regain the data link. If the UAS, which is equipped with a GPS communication system, is unable to re-establish contact with the control station, it will rely on an auto-pilot feature that returns the UAS to the home point via the original flight path from the launch point. This will eliminate "fly-away" incidents and other flight deviations that are known to occur with other types of UAS aircraft.

The Turbo Ace Cinewing 6 HL using a NAZA M V2 control has been used for commercial cinematography and survey work due to both platforms being stable and simple to operate. The NAZA M control system has substantial commercial operating duty cycles inside the U.S. and is known for being rugged with a history of reliability in flight.

Operating Conditions

Petitioner will conduct commercial operations with the Turbo Ace Cinewing 6 HL only in accordance with a highly-detailed set of safeguards governing all phases of flight operations. Petitioner employees responsible for UAS operations will always place a priority upon minimizing risk to personnel, equipment, assets and the environment. To ensure the highest level of safety, UAS flight operations will only be conducted after an extensive safety briefing (including Petitioner and customer personnel) and a risk analysis has been conducted. A majority of Petitioner's operations will be in sparsely populated rural agricultural areas that pose no risk of injuries to humans.

All UAS flights operated by Petitioner will be conducted by a minimum of two operational personnel, including a system supervisor. No flights may be initiated unless a preflight checklist has been completed and signed by all those Petitioner employees performing the checks. The checklist procedure includes a detailed inspection of the Turbo Ace Cinewing 6 HL prior to the initiation of any operations. Attached as Exhibit A to this exemption petition, is a copy of Aerial Intelligence HD, LLC's pre-flight and post-flight checklist. Any UAS operations to be conducted at an altitude of more than ten feet require the prior approval of Petitioner supervisory personnel. Most importantly, from a safety perspective, operations directly overhead Petitioner and customer personnel are not permitted as the UAS aircraft must be operated at all times at no more than a 30 degree oblique to any personnel.

There are several additional mandates that Petitioner employees will observe in connection with all commercial operations with the Turbo Ace Cinewing 6 HL, including the following:

- No flights through an established Air Defense Identification Zone (ADIZ);
- UAS flights shall not exceed 400 feet above ground or above the sea level per FAA Advisory Circular 91-57;
- All flights will be conducted in Class G airspace;
- All flights will be conducted within line-of-sight of UAS operator;
- All flights will be conducted in accordance with Class G airspace visibility requirements;
- Wind speed shall not exceed 25 knots;
- UAS operations will be conducted during daylight hours;
- A Notice to Airmen {NOTAM) will be filed with the FAA prior to each UAS operation;

At no point in time will Aerial Intelligence, HD's UAS aircraft be allowed to share airspace with commercial aircraft. Prior to conducting operations within three miles from any airport runway, Petitioner will notify the airport operator or the airport tower, as the case may be, in compliance with FAA Advisory Circular 91-57. Petitioner employees will terminate any UAS operations when an approaching commercial aircraft is within five nautical miles.

Operator Requirements

Aerial Intelligence HD, LLC's commercial UAS operations will build on its years of experience as a Licensed, Professional Mechanical Engineer. Only Petitioner employees who have undergone and successfully completed a rigorous competency assessment evaluation will be selected to operate the Turbo Ace Cinewing 6 HL. Operators must demonstrate not only a superior knowledge of the technical issues associated with UAS systems, including the full range of the capabilities and limitations of the Turbo Ace Cinewing 6 HL aircraft, but also must show sound piloting techniques and the ability to navigate around structures. Petitioner employees conducting UAS commercial operations will enforce compliance more stringently than written and not accept that "compliance means safe".

The Petitioner operators of the Turbo Ace Cinewing 6 HL have previous significant experience as the operators of the equipment. Any operator of the Turbo Ace Cinewing 6 HL will undergo a program of simulator training as well as hands-on flight training in a simulated inspection environment. Simulator training will allow these employees to gain experience with the specific flight characteristics of the Turbo Ace Cinewing 6 HL prior to any actual commercial operations.

The following requirements will apply to any commercial UAS operations conducted by Petitioner:

- A pilot-in-command (PIC) will be designated at all times for each flight;
- The PIC will be directly responsible for, and have final authority over the operation of the UAS;
- The PIC will not perform concurrent duties as the visual observer;
- The PIC will be qualified on the Turbo Ace Cinewing 6 HL;
- The PIC will exercise control over the UAS as it will not maneuver autonomously.

Given technical education, training and personal and professional safety record, the amount of required training, and the operational procedures applicable to Petitioner operating the Turbo Ace Cinewing 6 HL for commercial purposes, Petitioner PIC's should not be required to hold an FAA pilot certificate. The commercial UAS operations by Petitioner will resemble the circumstances under which the FAA will issue a Certificate of Waiver or Authorization to UAS operators without requiring pilot certification. All operations will be in Class G airspace, conducted during daylight hours under visual line-of-sight flight procedures no more than one-half nautical mile laterally from the Petitioner PIC.

The manager for Aerial Intelligence HD, LLC's commercial UAS operations is Thomas Hotard, P.E. Mr. Hotard is a degreed Mechanical Engineer (BSME) has over thirty years of experience designing, testing, and operating microprocessor-controlled industrial equipment and components.

Exemption Request Summary

Petitioner is requesting an exemption from FAA regulations in order to conduct commercial UAS operations with a Turbo Ace Cinewing 6 HL. Attached below is a list of each FAA regulation from which the Petitioner is requesting an exemption and the justification for each such exemption. In accordance with FAA requirements, in the case of each requested exemption, Petitioner is suggesting alternate methods of compliance that will provide a level of safety equivalent to that provided by the regulation from which an exemption is sought.

Petitioner's request is consistent with the FAA's policies for the granting of exemptions. It also is in accordance with the direction provided by Congress in Section 333 of the FAA Modernization and Reform Act of 2012 ("FAA Modernization Act"), instructing the Secretary of Transportation to determine which UAS aircraft operating within visual line of sight may be integrated into the National Airspace System NAS before the development of regulations governing the commercial use of other types of UAS aircraft. Because of the relatively small size, light weight, speed and operational capabilities of the Turbo Ace Cinewing 6 HL, as well as the strict visual line of sight protocols under which these UAS will be operated by Petitioner, the Turbo Ace Cinewing 6 HL aircraft may be safely operated without creating a hazard to other users of the NAS or a threat to national security. The Turbo Ace Cinewing 6 HL, operated as proposed herein, is therefore the type of UAS that ought to be the subject of operational approval by the Department of Transportation prior to the issuance of regulations governing the operation of small, unmanned aircraft systems generally.

The UAS operations to be conducted by Petitioner pursuant to the requested exemption offer significant safety enhancements over current methods of providing the same commercial services. Turbo Ace Cinewing 6 HL aircraft have the ability to fly into difficult-to-access areas that present substantial hazards to other methods of data collection, including those involving close-up inspections by human beings. In evaluating Petitioner's request for an exemption, the FAA should consider not just the ability of Petitioner to achieve a level of safety equivalent to that afforded by the regulations from which an exemption is sought, but also the safety benefits to be derived from using UAS aircraft for services now performed by other means at substantially greater risk to human life. As demonstrated below, the FAA can allow these benefits to be realized without compromising its obligation to promote the highest level of aviation safety.

Respectfully submitted,

Thomas Hotard, P.E.
Owner/Operator
Aerial Intelligence, HD LLC

## AERIAL INTELLIGENCE HD, LLC- ITEMIZED EXEMPTION REQUESTS

Aerial Intelligence HD, LLC requests an exemption from the following regulations of the Federal Aviation Administration:

### 14 C.F.R. § 45.23(b)- Display of marks; general

This regulation requires the display of an "N" registration mark on any U.S.-registered aircraft. Additional markings are required for limited or restricted category aircraft, experimental aircraft or provisionally-certificated aircraft on the entrance to the cabin, cockpit or pilot station.

Referencing Exemption 11109 **Regulatory Docket No. FAA–2014–0507,** In the matter of the petition of **CLAYCO, INC.**

> Regarding the petitioner's requested relief from 14 CFR 45.23(b) *Display of marks*, the petitioner requests this relief under the assumption that marking with the word "experimental" will be required as a condition of a grant of exemption. However, this marking is reserved for aircraft that are issued experimental certificates under 14 CFR 21.191. The petitioner's UAS will not be certificated under § 21.191, and therefore the "experimental" marking is not required. Since the petitioner's UAS will not be certificated under § 21.191, a grant of exemption for § 45.23(b) is not necessary.

Equivalent level of safety analysis: The surface area of the Turbo Ace Cinewing 6 HL is not large enough to contain any of the markings required by the FAA for limited or restricted category aircraft, experimental aircraft or provisionally-certificated aircraft. One of the purposes served by these markings is to caution passengers onboard such an aircraft (including any pilot) that it does not meet all of the FAA's requirements for a standard category certificate of airworthiness. As the Turbo Ace Cinewing 6 HL will not carry any passengers, and otherwise will operate in accordance with strictly-controlled flight parameters, the absence of such a warning on the Turbo Ace Cinewing 6 HL will not result in any reduction in the overall safety of the operation.

Petitioner is willing to include any markings that may be required by the FAA in connection with its commercial UAS operations, with the understanding that the surface area of the Turbo Ace Cinewing 6 HL will not permit lettering that is larger than one inch in height. In addition, if requested by the FAA, Petitioner can place markings on each of the control stations used to operate Petitioner's UAS aircraft.

### 14 C.F.R. Part 21, Subpart H: Airworthiness Certificates
### 14 C.F.R. § 91.203: Civil Aircraft: Certifications Required

Under 14 C.F.R. § 91.203, all U.S.-registered aircraft are required to have a certificate of airworthiness issued by the FAA. Part 21, Subpart H of the FAA's regulations establishes the procedural requirements for the issuance of airworthiness certificates by the FAA.

Referencing Exemption 11109 **Regulatory Docket No. FAA–2014–0507,** In the matter of the petition of **CLAYCO, INC.**

> The petitioner requested relief from 14 CFR part 21, Certification procedures for products and parts. In accordance with the statutory criteria provided in Section 333 of P.L. 112-95 in reference to 49 USC § 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, and any associated noise certification and testing requirements of part 36, is not necessary.

Equivalent level of safety analysis: The strict operational limitations under which Petitioner will conduct flights for commercial UAS applications (e.g., daylight operations, use of Class G airspace, all flights within line- of-sight of the operator) are at least as restrictive as the limitations that apply to the operation of limited or restricted category, experimental or provisionally-certificated aircraft. The Turbo Ace Cinewing 6 HL does not carry a pilot or any other passengers and their small size and electric motor reduce the danger that any collisions with the ground or structures will involve anything more than the loss of the sUAS.

**14 C.F.R. § 61.133(a): Commercial Pilot Privileges and limitations**

FAA regulations generally require that an aircraft may engage in operations for compensation or hire only if it is flown by a person holding a commercial pilot certificate. 14 C.F.R. § 61.133(a). Petitioner submits that hands-on experience with the flight characteristics of the Turbo Ace Cinewing 6 HL and UAS aircraft generally are a far more effective guarantee of flight safety than a pilot certificate would be in connection with Aerial Intelligence HD, LLC's proposed commercial UAS services.

Equivalent level of safety analysis. A UAS, such as the Turbo Ace Cinewing 6 HL has flight characteristics substantially different from manned aircraft. The propulsion system and control surfaces on the Turbo Ace Cinewing 6 HL respond to inputs that are transmitted remotely from the joy stick located on the control station. A pilot license of any kind would not be useful in the actual operation of the sUAS. An operator who had done all his training on the Turbo Ace Cinewing 6 HL, with no previous flight experience with manned aircraft, would have no preconceived notions or training to ignore and would be intimately familiar with maneuvering the Turbo Ace Cinewing 6 HL.

Aerial Intelligence HD, LLC employee/operator will act as an operator of Turbo Ace Cinewing 6 HL 6 HL commercially after successfully completing a minimum of 20 hours of UAS training flights. The above-listed hours will be recorded in logbooks subject to inspection by FAA personnel at any time.

By requiring extensive flight experience with the Turbo Ace Cinewing 6 HL prior to conducting commercial operations, Petitioner will have a better grasp of the handling of that aircraft and the available options in the event of an emergency than they would by holding a commercial pilot certificate for an entirely different type of airborne system.

**14 C.F.R. § 91.7(a): Civil Aircraft Airworthiness.**

This regulation prohibits the operation of an aircraft unless it is in an airworthy condition. The Turbo Ace Cinewing 6 HL 6 HL will not be the subject of an airworthiness certification process prior to their use by 01 for commercial UAS services.

Referencing Exemption 11109 **Regulatory Docket No. FAA–2014–0507,** In the matter of the petition of **CLAYCO, INC.**

Regarding the petitioner's requested relief from 14 CFR 91.7(a) *Civil aircraft airworthiness*, Clayco's request is based on its belief that "no FAA regulatory standard will exist for determining airworthiness," of the

Skycatch UAS. It claims an equivalent level of safety will be provided, "given the size of the aircraft and the requirements contained in the Manual for maintenance and use of safety checklists prior to each flight, as set forth in the Section B and Section G." While the UAS will not require an airworthiness certificate in accordance with 14 CFR part 21, Subpart H, the FAA considers the petitioner's compliance with its Flight Manual (hereinafter referred to as the operator's manual) to be sufficient means for determining an airworthy condition in accordance with § 91.7(a). Therefore, relief from § 91.7(a) is granted. The petitioner is still required to ensure that its aircraft is in an airworthy condition – based on compliance with manuals and checklists identified above – prior to every flight.

Equivalent level of safety analysis. 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 in the Operator's Manual for maintenance and use of safety check lists prior to each flight, an equivalent level of safety will be provided during operation of the sUAS

**14 C.F.R. § 91.9{b}(2): Civil Aircraft Flight Manual, Marking and Placard Requirements.**

This regulation requires that an approved flight manual, manual material, markings, placards or some combination thereof be placed onboard the aircraft. The Turbo Ace Cinewing 6 HL has a configuration suitable for compliance with this requirement.

Referencing Exemption 11109 **Regulatory Docket No. FAA–2014–0507,** In the matter of the petition of **CLAYCO, INC.**

The petitioner requested relief from 14 CFR 91.9(b)(2) *Civil aircraft flight manual, marking, and placard requirements* and 14 CFR 91.203(a) and (b) *Civil aircraft: Certifications required.* Based on the FAA Memorandum "Interpretation regarding whether certain required documents may be kept at an UA's control station," dated August 8, 2014, the requested relief from §§ 91.9(b)(2) and 91.203(a) and (b) is not necessary.

**14 C.F.R. § 91.109(a) and 14 C.F.R. § 91.109{c): Flight Instruction: Simulated Instrument Flight and Certain Flight Tests.**



Under this regulation, aircraft used for training purposes must have dual flight controls, subject to certain exceptions. FAA regulations also require that whenever training is provided in a simulator, the simulator must have a second control seat occupied by a safety pilot who possesses at least a private pilot certificate with category and class ratings appropriate to the aircraft being flown.

Equivalent level of safety analysis. Petitioner has flight instruction training program for its employees who will conduct commercial UAS operations. Pilots will be required to perform frequent training flights and refresher flights in a sterile environment with suitable objects for pilots to navigate to and around in a simulated commercial environment.

The requirement for dual flight controls on an aircraft used for training purposes is mitigated by the Turbo Ace Cinewing 6 HL's limited operational range, small dimensions and the use of lightweight construction materials, all of which reduce the risk of damage to surrounding structures in the event of an operator error that results in the loss of the aircraft.

**14 C.F.R. 91.119: Minimum Safe Altitudes: General**

This regulation specifies the minimum altitude in various flight environments below which aircraft are not allowed to operate. Petitioner will conduct the commercial services it proposes to operate below the FAA-specified minimum of 400 feet AGL and closer to vessels and structures than the minimum separation of 400 feet mandated by the FAA.

Equivalent level of safety analysis. The operation of the Turbo Ace Cinewing 6 HL aircraft exclusively in Class G airspace (i.e., below 400 feet) is intended as a safety measure to provide a level of separation between Aerial Intelligence HD's commercial UAS operations and the operation of manned aircraft at altitudes above 400 feet. Limiting the Turbo Ace Cinewing 6 HL to flights below the 400-foot AGL will enhance safety rather than compromise it. The risk of damage to any nearby structures or facilities is reduced by Turbo Ace Cinewing 6 HL's limited operational range, small dimensions and the use of lightweight materials in their construction. Petitioner requests narrowing separation from fixed structures to 100 feet in order to properly inspect said structure.

**14 C.F.R. § 91.121: Altimeter Settings**

Pursuant to this regulation, an aircraft that is operating below 18,000 feet above Mean Sea Level must contain an altimeter that is set to one of several designated altimeter settings prior to departure. The Turbo Ace Cinewing 6 HL for use in the Petitioner's operation includes provisions for an altimeter. This telemetry will be provided if deemed necessary.

Equivalent level of safety analysis: The operation of the Turbo Ace Cinewing 6 HL sUAS exclusively in Class G airspace (i.e., below 400 feet) away from commercial traffic and ATC-controlled airspace reduces the need for an altimeter onboard Petitioner's UAS aircraft. The altitude of Petitioner's UAS aircraft above Mean Sea Level and its GPS coordinates will be displayed on the screen of the remote control station used by the operator to perform any commercial services. The operator will have continuous situational awareness of the UAS altitude and position as flight operations will be conducted under line- of-sight flight procedures.

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

FAA regulations require that a rotorcraft operating under VFR conditions have sufficient fuel to fly to the first point of intended landing and, assuming normal cruising speed, to fly for at least an additional 30 minutes. Turbo Ace Cinewing 6 HL has a maximum operating time of 30 minutes.

Equivalent level of safety analysis. The FAA's regulations require sufficient reserves of additional fuel to enable a rotorcraft to find the nearest suitable landing zone if the intended landing facility is not available. The additional time that a multirotor is required to be able to operate is less than the time required to allow fixed-wing aircraft to find a suitable landing field (30 minutes during the day). Petitioner will perform commercial operations autonomously or in accordance with a pre-programmed flight plan. If the motors on the aircraft experience a power loss within 20% of empty, the

Turbo Ace Cinewing 6 HL has an audible and tactile alarm and failsafe home return system to ensure that the sUAS will have ample power and time required for a safe landing from the original open take-off area.

**14 C.F.R. § 91.203(a) & (b): Civil Aircraft: Certifications Required.**

The FAA requires that all civil aircraft have an appropriate and current airworthiness certificate and that the airworthiness certificate or special flight authorization for an aircraft be displayed at the cabin or cockpit entrance so that it is visible to passengers or crew. The Turbo Ace Cinewing 6 HL does not have a current airworthiness certificate nor do they have a surface area large enough to display a certificate of airworthiness or special flight authorization.

Equivalent level of safety analysis. The strict operational limitations under which Petitioner will conduct flights for commercial UAS applications (e.g., daylight operations, use of Class G airspace, all flights within line- of-sight of the operator) are at least as restrictive as the limitations that apply to the operation of aircraft that have been issued limited or restricted category, experimental or provisional certificates of airworthiness.

**14 C.F.R. § 91.405(a); 407(a)(1); 409(a)(2); 417(a): Aircraft Maintenance and Inspections; Maintenance Records.**

FAA regulations impose various requirements regarding the maintenance of civil aircraft, including periodic inspections, approval for return to service by a qualified mechanic following maintenance or repair, an airworthiness inspection and certain rules concerning maintenance recordkeeping. Petitioner's maintenance of its Turbo Ace Cinewing 6 HL will not satisfy these requirements.

Equivalent level of safety analysis. Petitioner will maintain the Turbo Ace Cinewing 6 HL in accordance with the manuals and operating handbook provided by the manufacturer. Because of the Turbo Ace Cinewing 6 HL's small size and lightweight construction, Petitioner will be able to subject it to top-to-bottom examination after every flight. All pre- or post-flight maintenance, equipment failures, charge cycle logs, fault/repair logs, inspections and general maintenance records will be kept on file for a minimum of three years. Petitioner has developed a lengthy pre/post-flight checklist; any sUAS which is unable to meet all the requirements for safe operation will be removed from service immediately and will not return to service until any defects have been remedied

If any parts have been updated by the manufacturer, Petitioner agrees to immediately place them on the sUAS if its purpose is to ensure its UAS has the most recent equipment and software to provide for public safety.

The number of hours that a sUAS has been in operation is logged by Petitioner to ensure proper life of components as well as the flight packs that provide power.