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

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

May 11, 2015

Exemption No. 11543
Regulatory Docket No. FAA–2015–0407

Mr. Robert M. Serino
8953 Chapel Avenue
Ellicott City, MD 21043

Dear Mr. Serino:

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 February 16, 2015, you petitioned the Federal Aviation Administration (FAA) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial photography, research and development, and volunteer services.

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 DJI Phantom 2.

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, Mr. Robert M. Serino 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, Mr. Robert M. Serino 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 DJI Phantom 2 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

16 February 2015

U.S. Department of Transportation, Docket Operations
West Building Ground Floor, Room W12-140
1200 New Jersey Avenue, SE
Washington, DC 20590

Re: Exemption Request Section 333 of the FAA Reform Act of the Federal Aviation Regulations from Part 21; and §§ 45.23(b); 61.113(a) & (b); 91.7(a); 91.9(b)(2); 91.103(b); 91.109; 91.119; 91.121, 91.151(a); 91.203(a) & (b); 91.405(a); 91.407(a)(1); 91.409(a)(2); and 91.417(a) & (b) of Title 14, Code of Federal Regulations. Precedence for this exemption request is FAA Exemption 11138 as petitioned and approved for Douglas Trudeau on 5 January 2015.

Dear Sir or Madam,

I, Robert M. Serino, FAA Licensed Private Pilot #33442220 am writing pursuant to the FAA Modernization and Reform Act of 2012 and the procedures contained within 14 C.F.R. 11, to request that I, Robert M. Serino, an owner and operator of small unmanned aircraft, be exempted from the Federal Aviation Regulations ("FARs") listed below so that I, Robert M. Serino, may operate small ultra light weight unmanned aircraft system ("UAS") commercially in airspace regulated by the Federal Aviation Administration ("FAA").

As described herein I, Robert M. Serino, FAA Licensed Pilot #33442220 for Airplane Single Engine Land am experienced in flying hobby helicopters for recreational purposes and for US Government purposes. I have added commercial grade DJI Phantom 2 quad-copters to my inventory that weigh approximately 3 pounds and are equipped with either a GoPro Hero3+Black camera or a FLIR Tau 2 camera (Figure 1). The cameras are used for recording imagery captured during flight as well as for providing real-time, remote First Person View (FPV) of the aircraft's flight path as well as local situational awareness and understanding for improved flight safety.

During flights, we would conduct two-person pilot plus observer activities at a low-altitude of under 150 feet, within a line-of-sight of under 750 feet, and only for daytime Aerial Photography and Research and Development. As outlined below, our intent is enhancement of community awareness for those individuals, not-for-profit organizations, and companies having either aerial photography or Research and Development needs in Maryland and Virginia as performed under an FAA-approved exemption:

- Application examples of Aerial Photography include efforts in support of real estate, construction, specialized facilities and events.

- Application examples of Research and Development include fast, remote sensing of

toxic and dangerous materials and conditions with compact, advanced technology sensors, system integration, and technical trials under simulated, relevant conditions.

- We would also make our services available on a volunteer/no-cost basis to local Not-for-Profit / Search and Rescue / HAZMAT / Fire Fighting organizations.

Figure 1. DJI Phantom 2 quad-copters with Radio Controllers and either a GoPro Hero3+Black camera or a FLIR Tau 2 camera. A tripod-mounted Ground Control Station with separate higher-resolution viewing screen is also shown.

Based upon a prior successful review of a Section 333 exemption application by the FAA, we intend to use Phantom 2 aircraft as recently approved by the FAA under Section 333 Exemption No. 11138 for Douglas Trudeau on 5 January 2015. The following nine Appendices A-I provide current, detailed information on safety, built-in safeguards, reliability and ease-of-operability for the commercial Phantom 2 aircraft we possess, and that would use under an approved exemption:

Appendix A - Phantom 2 Quick Start Guide
Appendix B - Phantom 2 User Manual
Appendix C - NAZA-M Quick Start Guide
Appendix D - Smart Flight Battery Safety Guidelines
Appendix E - 2.4G Bluetooth Datalink & iPad Ground Control Station User Guide

Appendix F - 5.8G VideoLink User Manual
Appendix G - Cloverleaf Antenna User Manual
Appendix H - Robert M. Serino #33442220 Safety Protocols and System Controls
Appendix I - Robert M. Serino #33442220 Safety of Flight Manual and Record

In terms of piloting experience under an exemption, I, Robert M. Serino, FAA Licensed Pilot #33442220, have been approved by the FAA to fly airplanes for over twenty-six (26) years since 6 April 1988, and have been flying RC electric helicopters for 1 (one) year; all without incident of any kind. The following Appendix J is an extract of my Pilot Logbook regarding take-offs/landings and flying hours of Phantom 2 UAS as Pilot-In-Command (PIC):

Appendix J - RM Serino_UAS PIC Pilot Logbook Extract

We are committed to safety with each flight, and an exemption would permit operation of ultra lightweight, unmanned (piloted by remote control) and comparatively inexpensive UAS in tightly controlled and limited airspace. We would fly in predetermined in areas for community videos, and within property boundaries for Aerial Photography and Research and Development. We would do so with markings and signage keeping activities 150 feet away from the general public and vehicular traffic, as well as fully comply with FAA directives on Flight Restricted areas such as airports, heliports, and special security zones, as well as NOTices to AirMen (NOTAM's) about Temporary Flight Restricted (TFR) areas such as sporting events, VIP events, and VIP routes or areas. GPS-based methods insure compliance with designated No-Flight Areas such as airports using GPS-based navigation and flight monitoring with and without aid of a Ground Control Station. An example flight-restricted 5-mile zone is shown for the Baltimore area on the Ground Control Station flight monitoring map (Figure 2).

Currently, similar lightweight, remote controlled UAS's are legally operated by unmonitored amateur hobbyists with no safety plan or controls in place to prevent catastrophe. I, Robert M. Serino, have personally instilled safety protocols and controls to avoid and prevent public hazard, as well as manned aircraft hazards catastrophe. We use materials and methods including those outlined and detailed in Appendices A-I.

These will further enable strict safety protocols exclusive to lightweight UAS's specific to real estate video and photography usage as I, Robert M. Serino, record flight data and other information gained through permitted flight operations to share with the FAA through any required FAA reports to assist with future protocol and safety regulation.

Granting my, Robert M. Serino, request conforms with the Secretary of Transportation's (FAA Administrator's) responsibilities and authority to integrate UAS's into the national airspace system, and to "...establish requirements for the safe operation of such aircraft systems [UAS's] in the national airspace system" under Section 333(c) of the Reform Act specific to the use of UAS's for real estate/Realtor purposes. Further I, Robert M. Serino, will conduct my operations in full compliance with the protocols described herein or as otherwise established and/or amended by the FAA.

For the reasons stated below, I, Robert M. Serino, respectfully request the grant of an exemption allowing me to operate ultra lightweight, remote controlled UAS's for daytime Aerial Photography and Research and Development. Our intent is enhancement of community awareness for those individuals, not-for-profit organizations, and companies having either Aerial Photography or Research and Development needs in Maryland and Virginia as performed under an FAA-approved exemption. In one example, this approval would serve community needs by greatly enhancing commercial property listings for those who cannot afford expensive manned aircraft for the same purpose; thereby, promoting faster economic growth through increased sales, employment and tax base. In a second example, this approval could enable development of advanced useful capabilities for the fast, remote sensing of toxic and dangerous materials and conditions for enhanced protection of the public. Further, this approval would hold public safety foremost by keeping away from the public heavier manned aircraft operated under similar conditions with 500x larger mass and containing many gallons of combustible fuel.

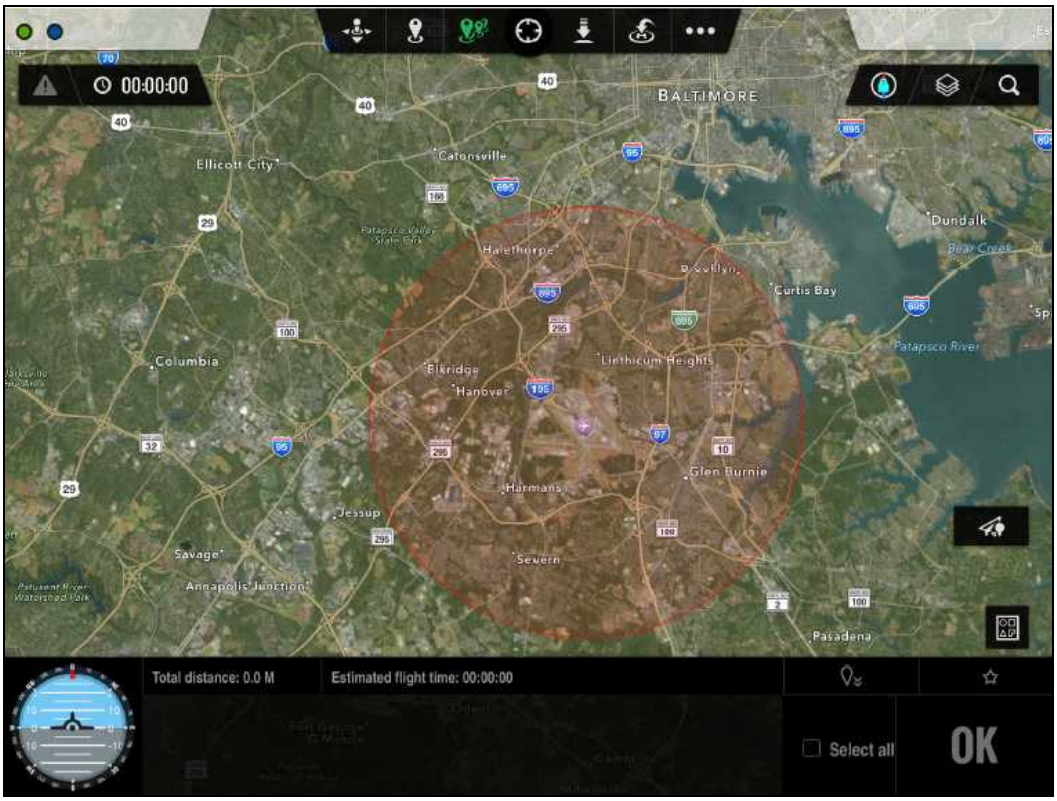


Figure 2. GPS-based methods insure compliance with designated No-Flight Areas such as airports using GPS-based navigation and flight monitoring with and without aid of a Ground Control Station. An example flight-restricted 5-mile zone is shown for the Baltimore area on the Ground Control Station flight monitoring map.

I. Contact Information:

Robert M. Serino, Ph.D
FAA Licensed Private Pilot #33442220
8953 Chapel Avenue
Ellicott City, MD 21043
(240)461-3954
robertmserino@yahoo.com

II. The Specific Sections of Title 14 of the Code of Federal Regulations From Which Robert M Serino Requests Exemption are:

14 CFR 21;
14 C.F.R. 45.23(b);
14 CFR 61.113 (a) & (b);
14 C.F.R. 91, et seq.;
14 CFR 407 (a) (1);
14 CFR 409 (a) (2); and,
14 CFR 417 (a) & (b).

III. The Extent of relief Robert M. Serino seeks and the Reason He Seeks Such Relief:

I, Robert M. Serino, submit this application in accordance with the Reform Act, 112 P.L.95 §§ 331-334, seeking relief from any currently applicable FARs operating to prevent me, Robert M. Serino, contemplated commercial cinematic, charitable, voluntary, and other flight operations within the national airspace system. The Reform Act in Section 332 provides for such integration of civil unmanned aircraft systems into our national airspace system as it is in the public's interest to do so. My, Robert M. Serino's, ultra lightweight UAS meets the definition of "small unmanned aircraft" as defined in Section 331 and therefore the integration of my ultra lightweight UAS is expressly contemplated by the Reform Act. I would like to operate my ultra lightweight UAS prior to the time period by which the Reform Act requires the FAA to promulgate rules governing such craft. Allowing such will provide direct experience and valuable information for formal regulation that can be administered uniformly to other UAS-related activities for aerial video and photography.

The Reform Act guides the Secretary in determining the types of UAS's that may operate safely in our national airspace system. Considerations include: The weight, size, speed and overall capabilities of the UAS's; Whether the UAS will be operated near airports or heavily populated areas; and, Whether the UAS will be operated by line of sight. 112 P.L. 95 § 333 (a). Each of these items reflects in favor of an exemption for me, Robert M. Serino. My UAS utilizes four (4) counter-rotating propellers for balance, control and stability. My UAS is equipped with GPS and auto return, fail-safe safety technology, and weighs approximately three (3) pounds (far below the maximum 55 pounds limit); including camera with gimbal.

I, Robert M. Serino, consider safety to be the most important requirement for each and every flight. My small-unmanned aircraft is designed to hover in place via GPS and operate in less

than a 24 knots (15mph) wind. For safety, stability and fear of financial loss, I will not fly in winds exceeding 16 kph (10 mph). Built-in safety systems include a GPS mode that allows my UAS to hover in place when radio controls are released. With three modes to choose from, I utilize the GPS mode for both Aerial Photography and Research and Development. This is the safest, most reliable and stable mode to prevent accident and hazard. When pilot communication is lost, the UAS is designed to go into a Fail-Safe mode and slowly return-to-home; i.e., within 3 meters of the point of take off. In accordance with FAA regulations, I do not operate my UAS near airports, within temporary flight restricted areas, near hospitals or sporting event areas, near special security areas, and do not operate near areas where general public is anywhere within 150 feet. With an observer always present, we are constantly on alert for both people on the ground and manned aircraft in the air, and prepared to land/abort immediately to the nearest and safest ground point should a manned aircraft approach my location or I suspect manned aircraft may approach near my location.

My UAS is capable of vertical and horizontal operations, and are flown only within my line of sight and not to exceed 150 feet altitude and not to exceed 750 feet distance, as the remote control pilot in command. These distances are controlled by software-based, GPS-enabled input to the NAZA flight control software (Figure 3).

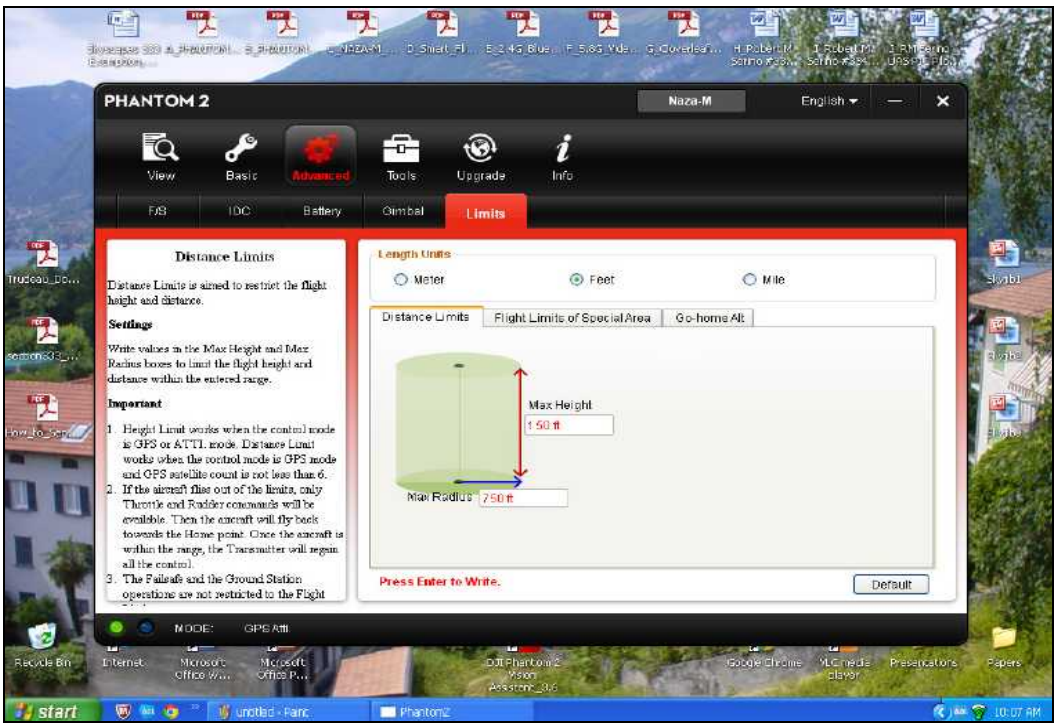


Figure 3. Maximum allowable height above ground and maximum allowable distance are controlled by software input to the NAZA flight control software.

Utilizing battery power rather than combustible fuels, flights will last not more than seven (7) to ten (10) minutes. I, Robert M. Serino, will utilize a fresh fully-charged Smart Battery with

each the start of each flight as a safety precaution; full flight time for each battery is 15 (fifteen) to twenty (20) minutes as tested; thereby providing not less than a fifty (50) percent Smart Battery power margin. I do not operate my UAS at or below manufacturer-recommend minimum charge levels for operation; preferring to remain well within a safe operating range to insure adequate communication between radio control and UAS to eliminate potential for crash, loss of control or hazard. Extra Smart Batteries are kept at hand and in reserve with each flight event to insure fast replacement and an always foremost safe level of operation (Figure 4).

Figure 4. Smart Battery employed in Phantom 2 provides immediate visual awareness and percent battery charge remaining as well as similar information during flight through Ground Control Station.

I do not believe in taking any risk that may cause any harm or could create a hazard to the public, to property and to manned aircraft, and have neither any desire what-so-ever to create such nor any desire to risk loss of an investment. I have recorded numerous practice flights in remote areas as a hobbyist simulating flights for future commercial use to gain familiarization with the characteristics of this specific UAS's performance under different temperature and weather conditions. I also practice computerized simulated flights to maintain adequate skills and response reflex time. All for the sake of safety, I, Robert M. Serino, am extremely cautious when operating my UAS/ultra lightweight unmanned aircraft and will not "create a hazard to users of the national airspace system or the public." 112 P.L. 95 § 333 (b). Given the small size and weight of my UAS, it falls well within Congress's

contemplated safety zone when it promulgated the Reform Act and the corresponding directive to integrate UAS's into the national airspace system. Robert M. Serino's Phantom 2 UAS, used in hobby flight, has a demonstrable safety record and does not pose any threat to the general public or national security.

IV. How Robert M. Serino's Request Will Benefit the Public As A Whole:

Aerial Photography for geographical awareness and commercial sales has been conducted for years through manned fixed-wing and rotary-wing aircraft. For small budget businesses and homeowners, the expense of such Aerial Photography is cost-prohibitive in the hundreds to thousands of dollars. Only larger companies and luxury home owners can afford to absorb such expense; depriving non-luxury home owners and small businesses from a valuable imaging tool. Small UAS will allow businesses to leverage airspace faster and at a greatly lower cost than a manned system.

Research and Development for fast, remote sensing of toxic and dangerous materials, and the supporting system integration of sensor packages is focused on maximizing the value of unmanned systems for employment into very hazardous conditions and for which the operational value is potentially very high. Key technologies are coming available fast to protect people better, and this field of endeavor becomes all-the-more-important with an increasing number and diversity of threats.

Manned aircraft can pose a threat to the general public through a potentially catastrophic crash, and communities have experienced such in the past through both the mass of the aircraft and the on-board combustible fuel that can burn persons and property quite violently upon impact. My UAS poses no such impact threat to the general public since size / weight / power is approximately 1/500th of a manned aircraft and the lack of combustible fuel alleviates any potential burning threat to the general public.

Congress has already proclaimed that it is in the public's interest to integrate commercially flown UAS's into the national airspace system, hence the passing of the Reform Act. Granting my, Robert M. Serino's, exemption request furthers the public interest through visual awareness and Research and Development in the Maryland and Virginia area. In furtherance of the public's interest, we would also make our services available on a volunteer/no-cost basis to local Not-for-Profit / Search and Rescue / Fire Fighting organizations.

My ultra lightweight UAS is battery powered and creates no emissions that can harm the environment. The consequence of my ultra lightweight UAS crashing is far less than a full size helicopter or fixed wing aircraft; which are heavy, contain a pilot, many gallons of combustible fuel and can cause catastrophic devastation to the public. The Smart Battery employed in Phantom 2 provides immediate visual awareness and percent battery charge remaining as well as similar information during flight through Ground Control Station.

The public's interest is further supported by minimizing the potential for ecological damage and crash threats by permitting my battery operated ultra lightweight UAS's. Permitting me,

Robert M. Serino, to immediately fly within national air space furthers economic growth. Granting my exemption request substantially furthers the economic impact for the Maryland and Virginia area for companies, families and (ultimately) Government agencies, as well as Not-for-Profit / Search and Rescue / HAZMAT / Fire Fighting needing enhanced local and situational awareness, all of which serve to strengthen, protect, and stimulate the community.

V. Reasons Why Robert M. Serino's Exemption Will Not Adversely Affect Safety Or How The Exemption Will Provide a Level of Safety At Least Equal To Existing Rule:

My, Robert M. Serino's, exemption will not adversely affect safety. I have been flying for 26 years with zero incidents and quite to the contrary for the reasons stated, permitting me, Robert M. Serino, to log more flight time in FAA controlled airspace. Further, this exemption would enable communication with the FAA and allow me to contribute to the innovation and implementation of new, innovative, and as of yet undiscovered safety protocols for Aerial Photography / Research and Development / Not-for-Profit support / Search and Rescue / HAZMAT support / Fire Fighting support in cooperation with the FAA.

In addition I, Robert M. Serino, submit the following representations on enhancements to current approaches to Aerial Photography and Research and Development:

- My UAS weighs approximately 3 pounds complete with a small ultra lightweight high quality GoPro Hero3+ Black camera or FLIR Tau 2 camera;
- I only operate my UAS at less than 150 feet altitude. Altitude limits are software-defined and GPS-enabled, and well within the 400 foot permissible ceiling set by the FAA Modernization and Reform Act of 2012;
- I pilot my UAS through remote manual and GPS-stabilized control only by line-of-sight not beyond 750 feet. Distance limits are software-defined and GPS-enabled.
- I pilot my UAS with the aid of a Ground Control Station with real-time monitoring of Smart Battery status, GPS signals, Geo-Location, and embedded emergency modes for Auto-Land and Return-to-Home (Figure 5);
- I pilot my UAS with the aid of a Radio Controller, and additional emergency modes are embedded within the Radio Controller for Fail-Safe, Home-Lock, and Command Shut-Off;
- The Ground Control Station I use is on an iPad platform and has an embedded Weather App for real-time monitoring of local weather reports, warnings and doppler weather radar.
- My UAS only operates for less than 10 minutes per flight with an unused 50% Smart Battery power margin;
- I land my UAS prior to manufacturer recommended minimum level of battery power;
- My UAS has a GPS-based flight safety feature whereby it returns-to-home and then slowly lands if communication with the remote control pilot is lost;
- I actively analyze flight data and other sources of information to constantly update and enhance safety protocols;
- I only operate in reasonably safe environment that are strictly controlled, are away from power lines, elevated lights, airports and actively populated areas;
- I conduct extensive pre-flight inspections and protocol, during which safety carries the

pre-eminent importance;

- I always obtain all necessary permissions prior to operation; and,
- I have procedures in place to abort flights in the event of safety breaches or potential danger.

My, Robert M. Serino's, safety protocols provide a level of safety equal to or exceeding existing rules. It is important to note that absent the integration of commercial UAS into our national airspace system, 1,500+ pounds rotary-wing and fixed-wing aircraft are the primary means of Aerial Photography and airborne sensing. While the safety record of such aircraft is remarkable, there have been local incidents involving loss of life as well as extensive property damage; thus, it is far safer to operate a 3-pound, battery powered ultra lightweight UAS.

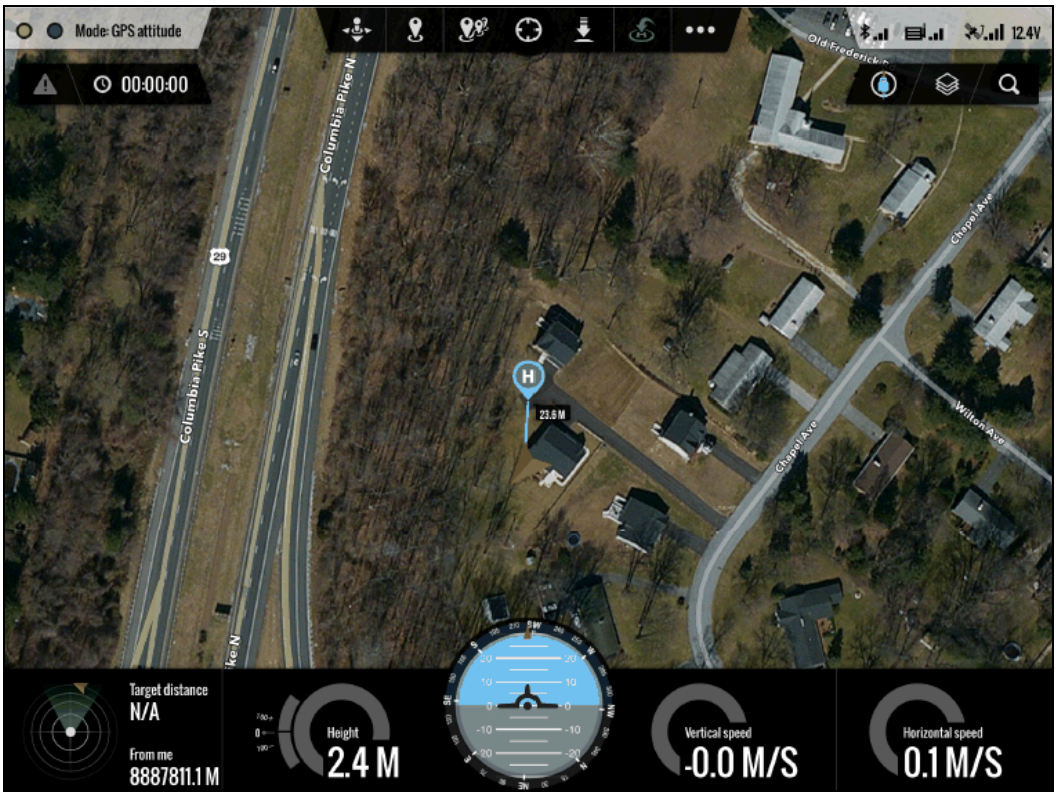


Figure 5. Ground Control Station with real-time monitoring of Smart Battery status, GPS signals, Geo-Location, and embedded emergency modes for Auto-Land and Return-to-Home. Additional emergency modes for Fail-Safe, Home-Lock, and Command Shut-Off are embedded on the Radio Controller. Weather App for real-time local weather reports, warnings and doppler weather radar is also embedded within iPad platform. Screenshot taken during photo for Figure 1. Geo-location and orientation indicated on map by red arrowhead and GPS-recorded home point indicated by "H" icon.

- First, the potential loss of life is diminished because UAS's carry no people onboard and I only operate my UAS in specific areas away from mass populations.
- Second, there is no fuel on board a UAS and thus the potential for fire or explosions is greatly diminished.

- Third, the small size and extreme maneuverability of my UAS allow me to remotely pilot away from and avoid hazards quickly and safely.
- Lastly, given its small size and weight, even when close enough to capture amazing images, my UAS need not be so close to the objects they are focused on through the technology and use of post editing software allowing pan and zoom. Accordingly, my UAS has been experimentally operated for familiarization/competency and will continue to operate at and above current safety levels.

VI. A Summary The FAA May Publish in the Federal Register:

A. 14 C.F.R. 21 and 14 C.F.R.91: Airworthiness Certificates, Manuals and The Like. 14 C.F.R. 21, Subpart H, entitled Airworthiness Certificates, sets forth requirements for procurement of necessary airworthiness certificates in relation to FAR §91.203(a)(1).

The size, weight and enclosed operational area of my, Robert M. Serino's, UAS permits exemption from Part 21 because my UAS meets (and exceeds) an equivalent level of safety pursuant to Section 333 of the Reform Act.

The FAA is authorized to exempt aircraft from the airworthiness certificate requirement under both the Act (49 U.S.C.§ 44701 (f)) and Section 333 of the Reform Act. Both pieces of legislation permit the FAA to exempt UAS's from the airworthiness certificate requirement in consideration of the weight, size, speed, maneuverability, and proximity to areas such as airports and dense populations. My, Robert M. Serino's, current and projected UAS's meet or exceed each of the elements.

14 C.F.R. 91.7(a) prohibits the operation of an aircraft without an airworthiness certificate. As no such certificate will be applicable in the form contemplated by the FARs, this Regulation is inapplicable.

14 C.F.R. § 91.9 (b) (2) requires an aircraft flight manual in the aircraft. As there are no on board pilots or passengers, and given the size of the UAS's, this Regulation is inapplicable. An equivalent level of safety will be achieved by maintaining a safety/flight manual with the PIC during UAS flight operations. The FAA has previously issued exemptions to this regulation in Exemption Nos. 8607, 8737, 8738, 9299, 9299A, 9565, 9565B, 10167, 10167A, 10602, 10700 and 32827.

14 C.F.R. § 91.121 regarding altimeter settings is inapplicable insofar as my UAS utilizes the global positioning system to report altitude in real-time through the Ground Control Station plus maximum allowable altitudes and distances are pre-set through the NAZA flight control software.

14 C.F.R. § 91.203 (a) and (b) provides for the carrying of civil aircraft certifications and registrations. They are inapplicable for the same reasons described above. The equivalent level of safety will be achieved by maintaining any such required certifications and registrations by me, Robert M. Serino on site during UAS flight operations.

B. 14 C.F.R. § 45.23: Marking of the Aircraft.

Applicable Codes of Federal Regulation require aircraft to be marked according to certain specifications. My UAS are, by definition, unmanned. They therefore do not have a cabin, cockpit or pilot station on which to mark certain words or phrases. Further, two-inch lettering is difficult to place on such small aircraft with dimensions smaller than the minimal lettering requirement. Regardless, I will mark the UASs in the largest possible lettering by placing the word "EXPERIMENTAL" on its fuselage as required by 14 C.F.R.§45.29 (f) so that I the pilot, or anyone assisting me as a spotter with the UAS will see the markings. The FAA has previously issued exemptions to this regulation through Exemptions Nos. 8738, 10167, 10167A and 10700.

C. 14 C.F.R. § 61.113: Private Pilot Privileges and Limitations: PIC.

Pursuant to 14 C.F.R.§§ 61.113 (a) & (b), private pilots are limited to non-commercial operations. I, Robert M. Serino, can achieve an equivalent level of safety as achieved by current Regulations because my UAS does not carry any pilots or passengers. Further, while helpful, a pilot license will not ensure remote control piloting skills. The risk associated to the operation of my UAS is far less than the risk levels inherent in the commercial activities outlined in 14 C.F.R. § 61, et seq. Thus, allowing me, Robert M. Serino, Principal and FAA Licensed Private Pilot #33442220, to operate my UAS will meet and exceed current safety levels in relation to 14C.F.R. §61.113 (a) & (b).

D. 14 C.F.R. 91.119: Minimum Safe Altitudes.

14 C.F.R. § 91.119 prescribes safe altitudes for the operation of civil aircraft. It allows helicopters to be operated at lower altitudes in certain conditions. My UAS will never operate at an altitude greater than 150 feet AGL; safely below the standard of 400 AGL. I, Robert M. Serino, will operate my UAS in safe areas away from public and traffic, providing a level of safety at least equivalent to those in relation to minimum safe altitudes. Given the size, weight, maneuverability and speed of my UAS, an equivalent or higher level of safety will be achieved.

E. 14 C.F.R. 91.405 (a); 407 (a) (1); 409 (a) (2); 417(a) & (b): Maintenance Inspections.

The above-cited Regulations require, amongst other things, aircraft owners and operators to "have [the] aircraft inspected as prescribed in subpart E of this part and shall between required inspections, except as provided in paragraph (c) of this section, have discrepancies repaired as prescribed in part 43 of this chapter. . . ." These Regulations only apply to aircraft with an airworthiness certificate. They will not, therefore, apply to my, Robert M. Serino's UAS. Nevertheless, as a safety precaution, I inspect my UAS before and after each flight. As an added measure, my aircraft have been routinely checked by the local OEM dealer, Intelligent UAS www.1uas.com to insure all elements and the total system are functioning to specification. Further, only OEM replacement parts are used in my Phantom 2

aircraft in order to insure the peak level of reliability and performance.

A Summary The FAA May Publish in the Federal Register: A. 14 C.F.R. 21 and 14 C.F.R. 91: Airworthiness Certificates, Manuals and The Like. 14 C.F.R. 21, Subpart H, entitled Airworthiness Certificates, sets forth requirements for procurement of necessary airworthiness certificates in relation to FAR § 91.203(a)(1). The size, weight and operational area of my UAS permit exemption from Part 21 because my, Robert M. Serino's UAS meets an equivalent level of safety pursuant to Section 333 of the Reform Act. The FAA is authorized to exempt aircraft from the air worthiness certificate requirement under both the Act (49 U.S.C. § 44701 (f)) and Section 333 of the Reform Act. Both pieces of legislation permit the FAA to exempt UAS's from the airworthiness certificate requirement in consideration of the weight, size, speed, maneuverability and proximity to areas such as airports and dense populations. My UAS meets or exceeds each of the elements. 14 C.F.R. 91.7(a) prohibits the operation of an aircraft without an airworthiness certificate. As no such certificate will be applicable in the form contemplated by the FARs, this Regulation is inapplicable. 14C.F.R. § 91.9 (b) (2) requires an aircraft flight manual in the aircraft. As there are no pilots or passengers, and given the size of the UAS's, this Regulation is inapplicable. An equivalent level of safety will be achieved by maintaining a manual onsite during UAS flight operations. The FAA has previously issued exemptions to this regulation in Exemption Nos. 8607, 8737, 8738, 9299, 9299A, 9565, 9565B, 10167, maintenance program that involves regular software updates and curative measures for any damaged hardware. Therefore, an equivalent level of safety will be achieved.

In summary, Robert M. Serino seeks an exemption from the following Regulations: 14 C.F.R. 21, subpart H; 14 C.F.R. 45.23(b); 14 C.F.R.§§ 61.113 (a) & (b); 14 C.F.R. §91.7 (a); 14 C.F.R.§ 91.9 (b)(2); 14 C.F.R.§ 91.103(b); 14 C.F.R.§ 91.109; 14 C.F.R.§91.119; 14 C.F.R.§ 91.121; 14 C.F.R.§ 91.151(a); 14 C.F.R.§§ 91.203(a) and (b); 14 C.F.R. § 91.405 (a); 14 C.F.R.§ 91.407 (a)(1); 14 C.F.R.§ 91.409 (a)(2); 14 C.F.R.§91.409 (a) (2); and, 14 C.F.R. §§ 91.417 (a) & (b) to commercially operate my, Robert M. Serino's, small, lightweight unmanned aircraft for benefit of the community and the local economy through Aerial Photography and Research and Development operations in Maryland and Virginia.

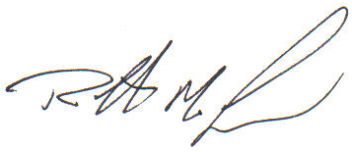
Aerial Photography and Research and Development operations currently rely primarily on the use of larger aircraft running on combustible fuel and posing an impact and flammables risk to the public. Granting my, Robert M. Serino, request for exemption will reduce current risk levels and thereby enhance safety. My UAS aircraft does not contain potentially explosive fuel, is smaller, lighter and more maneuverable than conventional manned photographic and R&D aircraft, and requires much less flight time to complete a flight mission. Further, I operate at lower altitudes and in controlled airspace; thereby, eliminating potential public risk by flying to and from established airfields.

I, Robert M. Serino, have been informally analyzing flight information and will compile safety protocols and the implementation of a flight operations manual for real estate usage that exceeds currently accepted means and methods for safe flight. Formal collection of information will be shared with the FAA, and will enhance the FAA's internal efforts to

establish protocols for complying with the FAA Modernization and Reform Act of 2012.

There are no personnel on board my, Robert M. Serino's, UAS and therefore the likelihood of death or serious bodily injury is significantly diminished. My, Robert M. Serino's, operation of my UAS, weighing approximately 3 pounds and travelling at lower speeds within limited areas will provide an equivalent level of safety as that achieved under current FARs. Accordingly I, Robert M. Serino, respectfully request that the FAA grant my exemption request. I, Robert M. Serino, am willing to cooperate in sharing information to benefit the FAA, safety of manned/unmanned aircraft, and the general public at large.

Respectfully submitted,



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robertmserino@yahoo.com

Appendices:

Appendix A - Phantom 2 Quick Start Guide
Appendix B - Phantom 2 User Manual
Appendix C - NAZA-M Quick Start Guide
Appendix D - Smart Flight Battery Safety Guidelines
Appendix E - 2.4G Bluetooth Datalink & iPad Ground Control Station User Guide
Appendix F - 5.8G VideoLink User Manual
Appendix G - Cloverleaf Antenna User Manual
Appendix H - Robert M. Serino #33442220 Safety Protocols and System Controls
Appendix I - Robert M. Serino #33442220 Safety of Flight Manual and Record
Appendix J - RM Serino_UAS PIC Pilot Logbook Extract