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

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

May 5, 2015

Exemption No. 11465
Regulatory Docket No. FAA–2015–0268

Mr. Matthew J. Clark
Counsel for Rimkus Consulting Group, Inc.
McKenna Long & Aldridge LLP
1676 International Drive, Penthouse
McLean, VA 22102

Dear Mr. Clark:

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 January 30, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Rimkus Consulting Group, Inc. (hereinafter petitioner or operator) for an exemption. The exemption would allow the petitioner to operate an unmanned aircraft system (UAS) to conduct aerial inspections and surveys of structures and facilities as part of forensic evaluations.

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 Vision+.

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, Rimkus Consulting Group, Inc. 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, Rimkus Consulting Group, Inc. 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 Vision+ 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

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January 30, 2015

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

Re: Petition of Rimkus Consulting Group, Inc., for an Exemption Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012

To Whom it May Concern:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 ("Reform Act") and 14 C.F.R. Part 11, Rimkus Consulting Group, Inc. ("Rimkus") hereby applies for an exemption from the Federal Aviation Regulations ("FARs") identified below, to allow commercial operation of small unmanned aerial vehicles (*i.e.*, "small unmanned aircraft" or "UAS") for conducting aerial inspections and surveys of structures and facilities as part of forensic evaluations.

This petition is made based on information outlined in this Petition for Exemption, as well as the accompanying Rimkus' UAS Flight Operations Manual and Aircraft Flight Manual (hereinafter "Rimkus' Operations Manuals"), DJI Phantom 2 Vision+ User Manual, Smart Flight Battery Safety Guidelines, and Phantom 2 Vision+ Pilot Training Guide (collectively referred to as "Manufacturer's Manual"). A copy of Rimkus' Operations Manuals and other supporting materials will be submitted to the FAA as confidential documents pursuant to 14 C.F.R. § 11.35(b), as the materials contain confidential commercial information that is highly proprietary to Rimkus. Additionally, these documents contain operating conditions and procedures that are not generally available to the public and are protected from release under the Freedom of Information Act, 5 U.S.C. § 552 *et seq.*

For your convenience, this Petition is organized as follows:

I. DESCRIPTION OF PETITIONER

Rimkus is a US-based international forensic engineering and consulting firm. Initially established in 1983 as R.E. Rimkus and Associates, and subsequently incorporated as Rimkus in 1987, Rimkus offers expert engineering and consulting services that span virtually all engineering disciplines, many scientific disciplines and forensic business analysis. Since its formation, Rimkus has continued to grow and transform itself into one of the premiere forensic engineering and consulting companies— boasting 45 offices worldwide with over 400 employees, and a team of expert engineers and consultants unmatched in the industry.

Today, Rimkus continues the vision of growth and exemplary services put into place years ago. As part of this vision, Rimkus seeks to leverage the latest UAS technologies to provide better and safer services. Forensic evaluations performed by Rimkus often involve the physical inspection of outdoor structures and facilities for the assessment of damage, defects and accidents. These inspections typically involve recording images to document existing conditions. Depending on the nature of the inspection, obtaining images of certain physical features may not be feasible due to dangerous conditions, limited access on the structure or the excessive height of the required viewing angle.

The use of UAS-assisted photography will provide a practical means to perform forensic inspections that would be otherwise infeasible or unsafe. The primary benefit of this technology would be to assist in the close, detailed aerial inspection and examination of building materials. In some instances, UAS-assisted photography would provide a means to survey broad overall views for large-scale areas. Inspection of steep-sloped roofs and multi-story exterior walls for residential and commercial buildings, examination of exhaust chimneys/stacks at industrial facilities, evaluation of impacted bridge beams, determination of burn patterns for a fire-damaged structure, and the assessment of accidents by documenting evidence are just a few examples of where UAS-assisted photography would be of great benefit.

Rimkus is dedicated to providing technologically driven and innovative solutions to address client needs. The promise of UAS-assisted photography offers a safer and more efficient means to perform forensic evaluations. This will better serve clients and improve public safety. It is in this spirit that Rimkus seeks an exemption to use UASs for the commercial purpose of performing aerial inspections/surveys during forensic evaluations.

The contact information for Petitioner is as follows:

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II. DESCRIPTION OF PROPOSED OPERATION

Rimkus seeks an exemption pursuant to Section 333 of the Reform Act to use small UASs weighing less than 3 pounds for conducting aerial inspections and surveys during its forensic evaluations discussed below. In addition, Rimkus intends to use UASs to conduct initial and recurrent training of its Pilots and Visual Observers ("Observers"), as required by the Rimkus Flight Operations Manual. Lastly, Rimkus intends to conduct functional test flights following UAS maintenance or replacement of flight critical components to ensure the aircraft is in a condition safe for operation. Both training and test flights will only occur in controlled and sterile environments as required by the Rimkus' Operations Manuals.

All UAS operations will occur under tightly controlled conditions. The proposed UAS operations will be conducted in accordance with the conditions and limitations of this Petition for Exemption and Rimkus' Operations Manuals. As detailed in Rimkus' Operations Manuals, the proposed UAS operations will be limited to daytime VFR conditions in uncontrolled airspace, and will occur at least 5 miles away from an airport.[1] Moreover, Rimkus' Operations Manuals incorporate redundant safeguards to assure that the aircraft does not travel outside the controlled area of UAS operations, including, but not limited to, GPS "geo-fencing" technologies and UA tethering procedures.

A. Roof Inspections

Rimkus performs thousands of roof inspections every year. While most involve roof slopes that are "walkable", Rimkus also inspects a large number of steep and tall roofs that are not safe to walk on. Some steep-sloped surfaces are accessible using specialized climbing gear, but not without significant falling risk to the inspecting engineer/consultant, and the possibility of causing damage to the roof covering itself. Moreover, some tall roofs are at such a height, that conventional ladders cannot reach them, and the use of a man lift may not be feasible due to site conditions. Further, some buildings have tall features extending from the roof, such as steeples and chimneys that are inaccessible using conventional inspection methods, and where full-scale aircraft cannot fly. UAS-assisted photography will aid in documenting the observable conditions of roof coverings that are simply not accessible by any other safe or practical means.

B. Exterior Façade/Wall Inspections

Some of Rimkus' inspections involve examining exterior walls of tall buildings for damages including, but not limited to, construction defects, overloading from wind and ice/snow,

[1] As discussed in Section IV(B), *infra*, the proximity to airports may be reduced to 1.5 nautical miles, provided that the UAS is tethered in accordance with Rimkus' Operations Manuals and all tethered UAS flight operations occur at or below the highest point of the structure being inspected, and is conducted in accordance with a NOTAM as required by petitioner's COA.

displacement associated with ice expansion, and long-term deterioration. If left unchecked, these types of damages often create falling debris hazards to the public. While the use of ladders, man lifts and swing-stage (*i.e.*, suspended) scaffolding are appropriate in some cases, depending on inspection conditions, these methods may expose inspecting engineers/ consultants to risk of harm or serious injury, making their use impossible. UAS-assisted photography provides a safe and effective alternative means for performing façade and wall inspections, while also minimizing the risk of harm to inspectors and the public.

C. Tower Inspections

Rimkus performs inspections of various types of tower structures, including, antenna systems extending above the ground or from the roofs of commercial buildings, tall monuments, water towers, power transmission or communication systems, wind turbines, agricultural silos, signs/billboards, and light poles. Inspection of these tower structures can be very challenging and dangerous for Rimkus engineers and consultants, and can often only be accomplished through use of binoculars or specialized camera equipment from a limited and remote viewing angle. UAS-assisted photography will aid in documenting the observable conditions of tower-type structures. It will also help identify visible defects or damage that left unchecked, might lead to structural failure and create a possible falling debris hazard to the public.

D. Bridge Inspections

Rimkus performs various types of bridge inspections. These inspections are usually precipitated by an impact event, where a vehicle (truck, boat, rail car) or material being transported struck the bottom of the bridge structure. In some instances, a visual inspection of the structural components of the bridge is performed in response to a suspected overload or deficient condition. Timely inspections of bridges is typically challenging due to the difficult proximity of the structural components, necessitating the need to use traffic control measures, ladders, and man lifts. While Rimkus has existing safety policies and procedures in place to address these concerns, including working with local law enforcement departments to control traffic conditions, and only working during non-peak traffic times, the process may not always be feasible or expedient. In conjunction with Rimkus' strict safety protocols, UAS-assisted photography will provide a safer and more practical means for performing timely inspection of bridge damage.

E. Fire Damage Inspections

Rimkus performs hundreds of fire origin and cause investigations every year for various types of industrial facilities, buildings and structures. Such assignments follow guidelines established by the National Fire Protection Association, for the safe and systematic investigation or analysis of fire and explosion incidents. These guidelines recommend that, "views from a high vantage point, which can be an aerial fire apparatus, adjacent building, or hill, or from an

airplane or helicopter can often reveal fire spread patterns.[2]" This information can help identify the origin of a fire and the extent of its reach. Similarly, aerial images provide by UAS can help determine the extent of fire or explosion damage across neighboring properties. Such evaluations are important to identify conditions that may be a public safety hazard.

F. Catastrophic Events

The evaluation of damage from catastrophic events often requires inspection from close and distant perspectives. Close inspection is required to evaluate specific damage to a particular structure; while broad, overall views are necessary to determine the widespread effects of the event across large areas / multiple properties. Such catastrophic events may include tornados, hurricanes, fires, explosions, flooding, and collapse of large structures. Quickly identifying the extent of damage from such events is vital to public safety concerns. UAS-assisted photography will aid in capturing overall views of the property or properties affected by a catastrophic event.

G. Vehicle Accident Investigations

Rimkus evaluates hundreds of vehicle accidents every year to determine the cause of an accident. These inspections commonly involve examination of the affected vehicle(s), as well as documenting conditions at the site where the accident occurred. Site inspections may require close examination to identify details such as skid marks, grade variations, roadway defects, etc. Broad, overall views across a large area are helpful for such an investigation, but often cannot be feasibly obtained using traditional fixed-wing or rotorcraft aircraft. Aerial images provided by UAS would aid in the analysis of vehicle pathways, traffic behavior at intersections, and visualizing the general area of the accident. Knowledge gained from vehicle accident investigations is used by the transportation industry to improve public safety. When necessary, local law enforcement shall be used to establish a secure zone around a traffic intersection to allow Aircraft operations per the guidelines in the Rimkus' Operations Manuals.

III. RELEVANT STATUTORY AUTHORITY

This Petition for Exemption is submitted pursuant to Section 333(a) through (c) of the Reform Act. Congress has directed the FAA "to safely accelerate the integration of civil unmanned aircraft systems into the national airspace system." Pursuant to Section 333 of the Reform Act, the FAA Administrator is to permit unmanned aircraft systems to operate in the National Air Space ("NAS") where it is safe to do so based on the following considerations:

- The UAS's size, weight, speed and operational capability;
- Operation of the UAS in close proximity to airports and populated areas; and

[2] NFPA 921, *Guide for Fire and Explosion Investigations* at Section 16.2.6.11.

- Operation of the UAS within the visual line of sight of the operator.

Additionally, the FAA Administrator has general authority to grant exemptions from the agency's safety regulations and minimum standards when the Administrator decides a requested exemption is in the public interest. *See* 49 U.S.C. § 106(f) (defining the authority of the Administrator); 49 U.S.C. § 44701(f) (permitting exemptions from §§ 44701(a), (b) and §§ 44702 – 44716, *et seq.*). A party requesting an exemption must explain the reasons why the exemption: (1) would benefit the public as a whole, and (2) would not adversely affect safety (or how it would provide a level of safety at least equal to the existing rules). *See* 14 C.F.R. § 11.81 (petitions for exemption).

IV. RIMKUS' PROPOSED UAS OPERATIONS MEET THE REQUIREMENTS OF SECTION 333 OF THE REFORM ACT

The small UAS operations proposed by Rimkus in this Petition for Exemption qualify for expedited approval pursuant to Section 333 of the Reform Act as each of the statutory criteria and relevant factors are satisfied.

A. Approval is Warranted Based on the UAS's Size, Weight, Speed, and Operational Capability

Rimkus will employ the DJI Phantom 2 Vision+ quadcopter for the operations specified in this Petition for Exemption. This is the same UAS model approved for use in the FAA's Grant of Exemption to Douglas Trudeau, Docket No. FAA-2014-0481.[3] This UAS has a maximum take-off weight of less than 3 pounds. The flight speed will not exceed 30 knots, and it will not be flown in controlled airspace or at an altitude that exceeds 400 feet AGL without prior written authorization and approval from the FAA, unless the height of the structure being inspected exceeds that height. If the height of the structure being inspected exceeds 400 feet AGL, the UAS will not be operated more than 50 feet above the highest point on the structure. All flights will be flown in such a way that they can be safely terminated once the operator receives the first low battery warning (approximately 30% of the battery's maximum charge). The DJI Phantom 2 Vision+ does not carry any flammable propellant or fuel. The UAS also has an integrated GPS system that calculates the UAS's position and height and relays that information via a secure connection to the operator. Moreover, as acknowledged by the FAA in its prior grant of exemption to Douglas Trudeau, the DJI Phantom 2 Vision+ "has the capability to operate safely after experiencing certain in-flight contingencies or failures and uses an auto-pilot system to

[3] The DJI Phantom 2 Vision+ has the same flight control functions and is substantially similar to the DJI Phantom 2 approved for use in the FAA's Grant of Exemption to Burnz Eye View, Inc., Docket No. FAA-2014-0519.

maintain UAS stability and control. The UAS is also able to respond to a loss of GPS or a lost-link event with pre-coordinated automated flight maneuvers."[4]

B. Approval is Warranted Based on the Operational Restrictions Set Forth in the Operations Manual

The Rimkus' Operations Manuals and the Manufacturer's Manual[5] for the selected UAS will contain all the procedures and limitations necessary to safely and successfully perform the operations specified in this Petition for Exemption. To assist the FAA in making a safety assessment of Rimkus' proposed operations, below is a summary of operational limitations and conditions that will ensure an equivalent or higher level of safety to operations conducted under current regulatory guidelines:

1. The UAS weighs less than 3 pounds, fully loaded.

2. The radio frequencies used for operations and control of the UAS (2.4GHz) will comply with the Federal Communications Commission ("FCC") or other appropriate government oversight agency requirements.

3. Minimum crew for each operation will consist of a pilot, who will be Pilot-in Command ("PIC") of the UAS, and one or more Visual Observers ("Observer") as necessary to safely conduct the mission.

4. The UAS shall be operated within Visual Line of Sight ("VLOS") of the PIC and Observer at all times. The PIC will use human vision unaided by any device other than corrective lenses.

5. The Observer designated for any operation will be in constant voice contact with the PIC.

6. The additional requirements identified in the exemption grant shall be added to the Rimkus' Operations Manuals. The Operations Manual will be maintained and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in the granted exemptions and the Rimkus' Operations Manuals, the conditions and limitations in the granted exemptions

[4] Docket No. FAA-2014-0481 at 12.

[5] The term "Manufacturer's Manual" includes all relevant manufacturer publications, including, but not limited to: operations and flight manuals, user guides, instruction manuals, component maintenance manuals, pilot training manuals, service information letters and, safety/service bulletins.

shall take precedence and must be followed. Otherwise, Rimkus' must follow the procedures outlined in their Operations Manuals.

7. The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough power to fly at normal cruising speed to the intended landing point and land the UA once the low battery warning is received (approximately 30% of the battery's maximum charge).

8. Flights will be operated at an altitude of no more than 400 feet AGL and will never enter navigable controlled airspace without prior written authorization and approval from the FAA. If the height of the structure being inspected exceeds 400 feet AGL, the UAS will not be operated more than 50 feet above the highest point on the structure.

9. Flights will be operated at a lateral distance of at least 500 feet from any nonparticipating persons, unless: (1) that person is in a position where he or she is shielded from the UAS and any possible debris resulting from UAS failure, or; (2) the UA is properly tethered as required by the Rimkus' Operations Manuals. Flight will be terminated if a nonparticipating person within 500 feet of an untethered UA leaves a shielded position. At no time will the UAS be operated so close to persons or objects to present an undue hazard to the PIC or Observer, per § 91.119(a).

10. UAS operations will occur at least 500 feet away from non-participating vehicles or structures unless: (1) the property owner/controller has granted permission and the PIC has made a safety assessment of the risk of operating closer to those objects, or; (2) the UA is tethered to a fixed location that will ensure the UA does not fly beyond the designated area of UAS operations, and will not become a hazard to non-participating vehicles or structures closer than 500 feet. At no time will the UAS be operated so close to structures or vehicles as to present an undue hazard to the PIC or Observer, per § 91.119(a).

11. Flights will be limited to a speed of 30 knots and vertical ascent will be limited to 19 fps.

12. Prior to each flight the PIC shall inspect the UAS to confirm that it is in a condition safe for flight. The PIC shall not operate the UAS if the inspection reveals a condition that affects the safe operation of the UAS until the necessary maintenance has been performed and the UAS is found to be in a condition for safe flight. The Ground Control Station ("GCS") shall be included in the preflight inspection. All maintenance and alternations must be properly documented in the UAS records.

13. The documents required under 14 C.F.R 91.9 and 91.203 will be available to the PIC at the GCS any time the UAS is operating. These documents will be made available to the Administrator or any law enforcement official upon request.

14. 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 in accordance with Rimkus' Operations Manuals. The PIC who conducts the functional test flight must make an entry in the UAS aircraft records of the flight. The requirements and procedures for a functional test flight and UAS record entry shall be included in the Rimkus' Operations Manuals.

15. The UAS will be operated and maintained according to the Manufacturer's Manuals and any required manufacturer Safety/Service Bulletins.

16. Prior to the operation, there will be a Mission Plan setting forth the operational limitations and conditions for the mission, as well as key personnel contact information and a description of any potential hazards on or in the vicinity of the survey site.

17. Rimkus will obtain an Air Traffic Organization ("ATO") issued Certificate of Waiver or Authorization, otherwise known as a COA, prior to conducting any operations under this grant of exemption. This COA will require Rimkus to request a Notice to Airman ("NOTAM") with an appropriate ATC facility between 48 and 72 hours before the flight.

18. All required permissions and permits will be obtained from territorial, state, county or city jurisdictions, including local law enforcement, fire or other appropriate governmental agencies.

19. Rimkus will coordinate its operations with the appropriate local Flight Standards District Office ("FSDO"). This requirement may be waived or modified by agreement with the applicable FSDO.

20. If the UAS loses communication with the PIC, it will have the capability to return to a pre-determined location within the operational area and land safely.

21. Contingency plans will be in place to safely terminate flight if there is a loss of communication between the PIC and the Observer.

22. The UAS will have the capability to safely abort flight in the case of unpredicted obstacles or emergencies. The PIC will abort the flight in the event of unpredicted obstacles or emergencies in accordance with the Rimkus' Operations Manuals.

23. PICs shall possess at least a Private Pilot's Certificate[6] and current Class III Medical Certificate. The PIC must also meet the flight review requirements specified in 14 C.F.R 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate.

24. Operations shall occur during daytime VFR Meteorological Conditions; flights under special visual flight rules ("SVFR") shall not be conducted.

25. The UAS will 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.

26. The aircraft shall remain clear and yield the right of way to all other manned operations and activities at all times (including, but not limited to, ultralight vehicles, parachute activities, parasailing activities, hang gliders, etc.).

27. The UAS will not be operated by the PIC from any moving device or vehicle.

28. UAS operations under Instrument Flight Rules, at night, or beyond VLOS are prohibited.

29. No UAS flight operations shall occur within 5 nautical miles of an airport reference point as denoted on a current FAA-published aeronautical chart unless: (1) a letter of agreement with that airport's management is obtained, and the operation is conducted in accordance with a NOTAM as required by petitioner's COA or; (2) the UAS is properly tethered in accordance with Rimkus' Operations Manuals and all flight operations occur at or below the highest point on the structure being inspected. Tethered UAS flight operations occurring at or below the highest point of the structure being inspected shall not occur within 1.5 nautical miles of an airport reference point as denoted on a current FAA-published aeronautical chart and must be conducted in accordance with a NOTAM as required by petitioner's COA.

30. All aircraft operated in accordance with this exemption will be identified by serial number, registered in accordance with 14 C.F.R part 47, and have identification

[6] The FAA has stated that it does not possess the authority under Section 333 of the Reform Act to exempt petitioners from the statutory requirement to hold an airman certificate, as prescribed in 49 USC § 44711. *See* Docket No. FAA-2014-0481 at 13. Should the FAA's interpretation of its authority under Section 333 of the Reform Act change in this regard, Rimkus will file a supplemental petition for exemption from the airman certification requirements of Part 61.

(N-Number) markings in accordance with 14 C.F.R. part 45, Subpart C. Markings must be as large as practicable.

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

V. REGULATIONS FROM WHICH EXEMPTION IS REQUESTED

The Federal Aviation Act expressly grants the FAA the authority to issue exemptions. This statutory authority, by its terms, includes exempting civil aircraft, as the term is defined under § 40101 of the Act, including UASs, from its safety regulations and minimum standards when the Administrator decides a requested exemption is in the public interest.[7]

Rimkus seeks an exemption from several interrelated provisions of Title 14 of the Code of Federal Regulations ("14 C.F.R") Parts 21, 45, 61 and 91 for purposes of conducting the requested operations using a UAS. Listed below are: 1) the specific sections of 14 C.F.R for which exemption is sought, and 2) the operating procedures and safeguards that Petitioner has established which will ensure a level of safety better than or equal to the rules from which exemption is sought.[8]

A. 14 C.F.R. Part 21, Subpart H – Airworthiness Certificates and 14 C.F.R. § 91.203(a)(1)

The FAA has stated that no exemption is needed from this section if a finding is made under the Reform Act that the UAS selected provides an equivalent level of safety when compared to aircraft normally used for the same application. These criteria are met, and therefore no exemption is needed. *See* Grant of Exemption to Astraeus Aerial, Docket No. FAA-2014-0352 at 13-14, 22. If, however, the FAA determines that there are some characteristics of the chosen UAS that fail to meet the requirements of the Reform Act, an exemption is requested.

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[7] *See* 49 U.S.C. § 44701(f) (authorizing the grant of exemptions from requirements of regulations prescribed pursuant to Sections 44701(a) and (b) and Sections 44702 - 44716).

[8] *See* 14 C.F.R § 11.81(e), which requires a petition for exemption to include:

> The reasons why granting the exemption would not adversely affect safety, or how the exemption would provide a level of safety at least equal to that provided by the rule from which you seek exemption.

Equivalent Level of Safety

As recognized by the FAA in its Grant of Exemption to Douglas Trudeau, the UASs that Rimkus will use are safe when taking into account their size, weight, speed, and operational capability.[9] As set forth in Section IV, *supra*, the UAS weighs less than 3 pounds and will be flown at less than 30 knots and completely outside controlled airspace, unless Rimkus has received prior written approval and authorization from the FAA for operations outside Class G airspace. Additionally, the UASs carry neither pilots nor passengers, carry no explosive materials or flammable liquid fuels, and operate exclusively within the parameters stated in Rimkus' Operations Manuals. The UAS has the capability to operate safely after experiencing certain in-flight contingencies or failures and uses an auto-pilot system to maintain UAS stability and control. The UAS is also able to respond to a loss of GPS or a lost-link event with pre-coordinated automated flight maneuvers. These safety features provide an equivalent level of safety compared to a manned aircraft holding a restricted airworthiness certificate performing a similar operation.[10]

Operations conducted under this exemption will be closely controlled and monitored by the operator and will be conducted in compliance with local public safety requirements, to provide security for the area of operation. Rimkus will also provide the FAA with advance notice of all operations via NOTAMs and coordination with the local FSDO, as necessary. In all cases, the UAS operated under the proposed conditions will be at least as safe as, or safer than, conventional rotorcraft operating with an airworthiness certificate.

Lastly, the UAS does not need a means to communicate with other aircraft or ATC, because those capabilities will be possessed by the PIC and Observer, who are not onboard the UAS. *See* Grant of Exemption, Docket FAA-2014-0352 at 13. In addition, no sense-and-avoid technology is necessary for the UAS because it will be operated at all times in VFR conditions and within VLOS of the PIC and Operator. *See id.*

B. 14 C.F.R. Part 27 Airworthiness Standards: Normal Category Rotorcraft

Title 14 C.F.R. Part 27 sets forth the procedural requirements for airworthiness certification of normal category rotorcraft. To the extent that Rimkus' small UASs would otherwise require certification under Part 27, Petitioner seeks an exemption from Part 27's airworthiness standards for the same reasons identified in the request for exemption from 14 C.F.R. Part 21, Subpart H, *supra*.

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[9] *See* Docket No. FAA-2014-0481 at 12 and 17.

[10] *See id.*

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

Inasmuch as there will be no airworthiness certificate issued for the UAS, Rimkus seeks an exemption from 14 C.F.R. § 91.7(a), which requires that a civil aircraft be in airworthy condition to be operated. The FAA has stated that no exemption is required for 14 C.F.R. § 91.7(a) to the extent that the requirements of Part 21 are waived or found inapplicable. *See* Docket No. FAA-2014-0352 at 13-14, 22. Accordingly, Petitioner requests that the requirements for § 91.7(a) be treated in accordance with Section V(A), *supra.*

D. 14 C.F.R. § 91.9(b)(2): Civil Aircraft Flight Manual in the Aircraft and 14 C.F.R. § 91.203(a) and (b): Carrying Civil Aircraft Certification and Registration

Title 14 C.F.R. § 91.9(b)(2) and § 91.203(a) and (b) require the operator to carry airworthiness documents and other aircraft manuals onboard the aircraft. Pursuant to 14 C.F.R. § 91.9(b)(2):

> (b) No person may operate a U.S.-registered civil aircraft –
>
> …
>
> (2) For which an Airplane or Rotorcraft Flight Manual is required by § 21.5 of this chapter, unless there is available in the aircraft a current approved Airplane or Rotorcraft Flight Manual, approved manual material, markings, and placards, or any combination thereof.

Pursuant to 14 C.F.R. § 91.203(a) and (b):

> (a) Except as provided in § 91.715, no person may operate a civil aircraft unless it has within it the following:
>
> (1) An appropriate and current airworthiness certificate…
>
> (b) No person may operate a civil aircraft unless the airworthiness certificate required by paragraph (a) of this section or a special flight authorization issued under § 91.715 is displayed at the cabin or cockpit entrance so that it is legible to passengers or crew.

Given the small size and configuration of the UAS, it would be impossible to keep airworthiness documents and other aircraft manuals on board the UAS because there is simply no room and the UAS has no cabin or cockpit.

Equivalent Level of Safety

In an FAA Office of Chief Counsel's Opinion dated August 8, 2014, and prepared by Dean E. Griffith, Attorney, AGC-220, it was acknowledged that the intent of 14 C.F.R. 91.9(b) and 91.203(a) and (b) is met if the pilot of the unmanned aircraft has access to the UAS flight

manual, registration certificate, and other required documents from the GCS from which he or she is operating the aircraft.[11] As this FAA Office of Chief Counsel Opinion clarifies, the intent of the rule is to ensure the PIC has access to these key documents during flight. Therefore, an equivalent level of safety will be achieved by ensuring that the PIC has access to the documents at the GCS from which he or she is piloting the UAS.

E. 14 C.F.R. §§ 91.9(c), 45.23(b) and 45.27(a): Aircraft Marking and Identification Requirements

Rimkus seeks an exemption from the aircraft marking and identification requirements contained in 14 C.F.R. §§ 91.9(c), 45.23(b) and 45.27(a).

- 14 C.F.R. § 91.9(c), Civil Aircraft Flight Manual, Marking and Placard requirements, provides that:

  > No person may operate a U.S.-registered civil aircraft unless that aircraft is identified in accordance with Part 45 of this chapter.

- 14 C.F.R. § 45.23(b), Markings of the Aircraft, states:

  > When marks include only the Roman capital letter "N" and the registration number is displayed on limited, restricted or light-sport category aircraft or experimental or provisionally certificated aircraft, the operator must also display on that aircraft near each entrance to the cabin, cockpit, or pilot station, in letters not less than 2 inches nor more than 6 inches high, the words "limited," "restricted," "light-sport, "experimental," or "provisional," as applicable.

- 14 C.F.R. § 45.27(a), Rotorcraft, states:

  > Each operator of a rotorcraft must display on that rotorcraft horizontally on both surfaces of the cabin, fuselage, boom, or tail the marks required by § 45.23.

In a previous Grant of Exemption, the FAA determined that exemption from these requirements was warranted provided that the aircraft "have identification (N-Number) markings in accordance with 14 C.F.R Part 45, Subpart C if the markings are as large as practicable." FAA Docket No. FAA-2014-0352.

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[11] Memorandum from Mark Bury, FAA Assistant Chief Counsel for International Law, Legislation and Regulation, to John Duncan, FAA Flight Standards Service (Aug. 8, 2014); *see also* Docket No. FAA-2014-0352 at 16-18.

Equivalent Level of Safety

All aircraft flown by Rimkus will bear N-number markings that are as large as practicable in accordance with 14 C.F.R. Part 45, Subpart C.[12]

F. 14 C.F.R. § 91.103: Preflight Action

Rimkus seeks an exemption from 14 C.F.R. § 91.103, which requires a PIC to become familiar with specific information before each flight, including information contained in the FAA-approved Flight Manual on board the aircraft. While the PIC will be familiar with all information necessary to safely conduct the flight, an exemption is requested to the extent that an FAA-approved Flight Manual is required.

Equivalent Level of Safety

An equivalent level of safety will be provided by following Rimkus' Operations Manuals and the Manufacturer's Manual. The PIC will perform a series of checklists designed to identify any defects or inoperable components in accordance with Rimkus' Operations Manual, including checklists covering Pre-Flight, Launch, Landing, and Post-Flight procedures. The PIC will also be required to review weather, flight requirements, battery charge, landing and takeoff areas, UA performance data, and contingency landing areas—before initiation of flight. Rimkus' Operations Manuals and the Manufacturer's Manual will be kept at the GCS and will be accessible to the PIC at all times while operating the UAS.

G. 14 C.F.R. § 91.109(a): Flight Instruction

Rimkus seeks an exemption from 14 C.F.R. § 91.109(a), which provides in pertinent part that "[n]o person may operate a civil aircraft (except a manned free balloon) that is being used for flight instruction unless that aircraft has fully functioning dual controls." UASs and remotely piloted aircraft, by their design, do not have functional dual controls. Instead, flight control is accomplished through the use of a device that communicates with the aircraft via radio communications. Accordingly, an exemption will be required for the flight instruction requirements of 14 C.F.R. § 91.109(a).

Equivalent Level of Safety

Given the size and speed of the UAS that Rimkus intends to use, an equivalent level of safe training can still be performed without dual controls because no pilot or passengers are aboard the UAS, and as required by the Rimkus' Operations Manual, all persons will be a safe distance away in the event that the UAS experiences any difficulties during flight instruction. Moreover, as required by Rimkus' Operations Manuals, all flight training will be conducted in

[12] *See, e.g.*, FAA Docket No. FAA-2014-0352, at 14.

controlled and sterile environment. As a whole, the safety procedures provided for in Rimkus' Operations Manual ensure that the proposed UAS operations provide an equivalent or higher level of safety than that provided by the flight instruction regulations.

H. 14 C.F.R. § 91.119: Minimum Safe Altitudes

Rimkus requests an exemption from the minimum safe altitude requirements of 14 C.F.R. § 91.119. Section 91.119 prescribes the minimum safe altitudes under which aircraft may not operate, including 500 feet above the surface and away from any person, vessel, vehicle, or structure in non-congested areas. *See* 14 C.F.R. § 91.119(c). Section 91.119(d) allows for a helicopter to operate at less than those minimum altitudes when it can be operated "without hazard to persons or property on the surface," provided that "each person operating the helicopter complies with any routes or altitudes specifically prescribed for helicopters by the FAA."

An exemption is required because the proposed UAS operations will normally need to occur below 400 feet AGL. In circumstances where the UAS is used to inspect a structure whose height exceeds 400 feet AGL, the UAS will not be operated more than 50 feet above the highest point on the structure. Additionally, due the nature of the proposed operations, the Pilot and/or Observers(s) may need to be less than 500 feet away from the UAS.

Equivalent Level of Safety

Compared to flight operations with rotorcraft weighing far more than the maximum weights proposed herein, and given the lack of flammable fuel with the UASs, any risk associated with these operations is far less than those that presently exist with conventional aircraft. An equivalent level of safety will be achieved given the size, weight, and speed of the UASs, as well the controlled and sterile location where the operations will occur. In order to avoid any risk to manned aircraft, flight operations will be restricted to 400 feet AGL or below, or when inspecting a structure whose height exceeds 400 feet AGL, within 50 feet above the highest point on that structure.

As set forth in Rimkus' Operations Manuals, the UASs will be operated in a restricted area, and all flights will be operated at a lateral distance of at least 500 feet from any nonparticipating persons, unless: (1) that person is in a position where he or she is shielded from the UAS and any possible debris resulting from UAS failure or; (2) the UA is tethered to a fixed location that will ensure the UA does not fly beyond the designated area of UAS operations, and will not become a hazard to persons closer than 500 feet. As required by Rimkus' Operations Manuals, flights will be terminated if a nonparticipating person within 500 feet of a non-tethered UAS leaves a shielded position. Further, UAS operations will occur at least 500 feet away from vehicles or structures unless: (1) the property owner/controller has granted permission and the PIC has made a safety assessment of the risk of operating closer to those objects and, operations near the PIC or Observer will not present an undue hazard per § 91.119(a), or; (2) the UA is properly tethered and will not present an undue hazard per § 91.119(a). As a whole, the policies

and procedures required by the Rimkus' Operations Manual ensure a level of safety better than or equal to the rules from which exemption is sought.[13]

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

Rimkus seeks an exemption from 14 C.F.R. § 91.121, which requires a person operating an aircraft to maintain cruising altitude or flight level by reference to an altimeter that is set to the elevation of the departure airport or barometric pressure. An exemption is required to the extent that the UASs do not have a barometric altimeter, but rather a GPS altitude read out.

Equivalent Level of Safety

The FAA has stated that an equivalent level of safety to the requirements of 14 C.F.R. § 91.121 can be achieved in circumstances where: (1) the UASs will be operated below 400 feet AGL or below[14], (2) within VLOS, (3) where GPS based altitude information is relayed in real time to the operator at a ground-based on-screen display and, (4) where prior to each flight, a zero altitude initiation point is established for the PIC to confirm accuracy of the onboard GPS.[15]

The UASs that Rimkus intends to use for the proposed UAS operations will meet all these operational characteristics. Moreover, as required by Rimkus' Operations Manuals, the PIC will be required to calibrate the aircraft's GPS compass prior to each flight operation. Like the Grant of Exemption to Astraeus Aerial, the UASs Rimkus intends to use, and the safety mitigation procedures contained in the Operations Manual, both ensure that an equivalent level of safety will be achieved, and a grant of exemption to the requirements of § 191.121 is therefore appropriate.

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[13] *See e.g.*, Grant of Exemption to Douglas Trudeau, Docket No. FAA-2014-0481 at 19:

> "If barriers or structures are present that can sufficiently protect nonparticipating persons from the UA or debris in the event of an accident, then the UA may operate closer than 500 feet to persons afforded such protection. The operator must also 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. When considering how to immediately cease operations, the primary concern is the safety of those nonparticipating persons. In addition, the FAA finds that operations may be conducted closer than 500 feet to vessels, vehicles and structures when the owner/controller of any such vessels, vehicles or structures grants permission for the operation and the PIC makes a safety assessment of the risk of operating closer to those objects and determines that it does not present an undue hazard."

[14] If the height of the structure being inspected exceeds 400 feet AGL, the UAS will not be operated more than 50 feet above the highest point on the structure.

[15] *See* Grant of Exemption to Astraeus Aerial, Docket No. FAA-2014-0352 at 21.

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

Rimkus requests an exemption from 14 C.F.R. § 91.151(a)'s fuel requirements for flight in VFR conditions. Section 91.151 states:

> (a) No person may begin a flight in an airplane under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing and, assuming normal cruising speed –
>
> (1) During the day, to fly after that for at least 30 minutes; or
>
> (2) At night, to fly after that for at least 45 minutes.

Here, the technological limitations on UAS battery power means that no meaningful flight operations can be conducted while still maintaining a 30-minute battery reserve. An exemption from the fuel requirements of 14 C.F.R. § 91.151(a) is therefore required.

Equivalent Level of Safety

The FAA has stated that an equivalent level of safety can be achieved by requiring that the PIC not begin a flight unless (considering wind and forecast weather conditions) there is enough power to fly to the first point of intended landing and, assuming normal cruising speed, land the UA at the first low battery warning.[16] Rimkus' Operations Manuals conforms to this limitation, and therefore provides an equivalent level of safety.

The UASs that Rimkus intends to use under this grant of exemption include a low battery warning system. The amount of battery reserve power remaining will be transmitted to the PIC via telemetric data feed, which downlinks from the UAS to a ground-based-on-screen display. The UAS is equipped to provide the operator with two low battery warning alerts; the first at ~30% , and a second critical low battery warning at ~15%. As required by Rimkus' Operations Manuals, the PIC will promptly fly the UAS back to the home launch location or pre-determined abort location where the UAS may safely land, once the first low-battery warning is displayed. Also, the UAS has an automated function which results in the UA immediate landing once the battery reaches a critically low levels (~15%).

Rimkus submits that the procedures requiring flights to be safely terminated once the first low battery warning is received, combined with the requirement that flights only be conducted within a secure, isolated area, using a UAS weighting less than 3 pounds, and within VLOS of

[16] Grant of Exemption to Douglas Trudeau, Docket No. FAA-2014-0481 at 19-20; *see also* Grant of Exemption to Advanced Aerial Solutions LLC, Docket No. FAA-2014-0508 at 22.

the PIC and Observer(s), ensure that the proposed operation will provide an equivalent or higher level of safety to that provided by the regulations from which exemption is sought.

K. 14 C.F.R. § 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2); 91.417(a) and (b): Maintenance Inspections

Rimkus seeks an exemption from the maintenance inspection requirements contained in 14 C.F.R. § 91.405(a), 91.407(a)(1), 91.409(a)(2); 91.417(a) and (b). These regulations specify maintenance and inspection standards in reference to 14 C.F.R. Part 43. *See, e.g.*, 14 C.F.R. § 91.405(a) (stating that each owner or operator of an aircraft "[s]hall have the aircraft inspected as prescribed in subpart E of this part and shall between required inspections …have discrepancies repaired as prescribed in part 43 of this chapter"). An exemption from these regulations is needed because Part 43 and these sections only apply to aircraft with an airworthiness certificate, which the UAS to be operated under this grant of exemption will not have.

Equivalent Level of Safety

An equivalent level of safety will be achieved because maintenance and inspections will be performed in accordance with the Manufacturer's Manuals and any required manufacturer Safety or Service Bulletins. Further, as required by Rimkus' Operations Manuals, the PIC will conduct a pre-flight inspection of the UAS and all associated equipment to account for all discrepancies and/or inoperable components. Maintenance will be performed and verified to address any conditions potentially affecting safe operation of the UAS and no flights will occur unless, and until all flight critical components of the UAS have been found to be airworthy and in a condition safe for operation. A functional test flight will be conducted following the replacement of any flight-critical components. As required by Rimkus' Operations Manuals, the PIC who conducts the functional test flight will make an entry in the UAS aircraft records of the flight.

Rimkus' Operations Manuals also includes requirements to follow the manufacturer's UAS aircraft/component, maintenance, overhaul, replacement, inspection, and life limit requirements for the following applicable components: powertrain system (powerplant), propellers, avionics and control surfaces (including ailerons/elevons), structures & airframe, camera system, electrical systems (including batteries), GCS, hazard accessories, and spare parts. Further, Rimkus' Operations Manuals also includes procedures to document and maintain a record of the UAS maintenance, preventative maintenance, alterations, status of replacement /overhaul component parts, and the total time in service of the UASs used under this grant of exemption. As a whole, the maintenance and inspection procedures required in Rimkus' Operations Manuals ensure that the proposed operation will provide an equivalent or higher level of safety to that provided by the regulations from which exemption is sought.

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

Rimkus seeks exemption from 14 CFR § 61.113, which restricts private pilot certificate holders from flying aircraft for compensation or hire, and would also require a second class

medical certificate. The purpose of Part 61 is to ensure that the skill and competency of any PIC matches the airspace in which the PIC will be operating, as well as requiring certifications if the private pilot is carrying passengers or cargo for hire. In this case, while the UASs will be operated as part of a commercial operation, it carries neither passengers nor cargo. In the Grant of Exemption to Astraeus Aerial[17], the FAA determined that the unique characteristics of UAS operation outside of controlled airspace did not warrant the addition cost and restrictions attendant with requiring a the PIC to have a Commercial Pilot Certificate and Class II Medical Certificate. The fulfillment of the additional requirements for a private pilot to become qualified as a commercial pilot would not lead to any additional safety benefits when UAS operations are involved.

The restrictions Rimkus has placed on its UAS operations meet or exceed the restrictions similarly imposed on Astraeus Aerial. Rimkus will operate away from persons and property not involved in the operation, and flights will occur outside controlled airspace. A NOTAM will also be issued between 48 and 72 hours before the flight is to occur, and the flight will be coordinated with the applicable FSDO, as required.

Equivalent Level of Safety

In addition to these flight restrictions, Rimkus will further ensure safe operation by requiring that any PIC be thoroughly versed not only in airspace and communication issues pertaining to all aircraft operators but also in the unique aspects of UAS flight. As set forth in Rimkus' Operations Manuals, pilots will have experience not only in UAS operations generally but have logged flight time in the specific make and model used for the operations before they are permitted to participate in commercial flights on behalf of Rimkus. The pilot qualification, training, and currency requirements in the Operations Manual ensure that Rimkus' pilots are competent and proficient in the UAS they are operating. Petitioner believes that this system will provide a higher level of competency and proficiency for its pilots and will ensure at least an equivalent level of safety.

VI. DRUG AND ALCOHOL PROGRAM

Rimkus will have policies in place to ensure that no person may participate in UAS flight operations if they are under the influence of alcohol or any drug.

VII. PUBLIC INTEREST

The public interest will be served by granting Rimkus' Petition for Exemption. Congress has established a national policy that favors early integration of UAS into the NAS in controlled, safe working environments such as those proposed in this Petition. Granting this Petition for Exemption helps fulfill Congress' goal in passing Section 333(a) through (c) of the Reform

[17] FAA Docket No. FAA-2014-0352.

Act—the FAA Administrator's assessment of whether certain UAS may operate safely in the NAS before completion of the statutorily required rulemaking.

The proposed UAS operations in this Petition for Exemption significantly improve safety and reduce risk by alleviating the public's exposure to danger associated with traditional aerial survey and inspection methods, namely, full size fixed-wing aircraft and rotorcraft. The UASs Rimkus intends to use weight less than 3 pounds, are battery powered, and create no emissions. Moreover, in the unlikely event that one of Petitioner's UASs crash, there is no fuel to ignite and explode.[18] Any accident involving Petitioner's lightweight UASs will present significantly less danger to the pilot and other individuals on the ground than one involving a full size helicopter.

Moreover, the images and photographic evidence collected using Rimkus' UASs will aid in documenting building and structural damage conditions which, if left unchecked, might lead to a falling debris hazard onto the public. The public will also benefit from the superior quality of the inspections resulting from UAS-assisted photography. Petitioner's UASs will be capable of documenting conditions that may have been otherwise inaccessible using traditional inspection and survey methods. UAS-assisted photography will also reduce the risk of harm to inspecting engineers and consultants by not exposing them to hazards associated with inspection of dangerous or unsafe physical conditions often present in buildings and structures that have been damaged, exhibit some defect, or are otherwise deteriorating.

VIII. PRIVACY

All Rimkus UAS operations will be conducted in accordance with applicable federal, state, or local laws regarding privacy. All operations shall be conducted over private or controlled-access property with permission from the land owner/controller or authorized representative. Permission from land owner/controller or authorized representative will be obtained for each flight to be conducted.

IX. FEDERAL REGISTER SUMMARY

Pursuant to 14 C.F.R. Part 11, the following summary is provided for publication in the FEDERAL REGISTER, should it be determined that publication is needed:

Petitioner seeks an exemption from the following rules in Title 14 of the Code of Federal Regulations:

[18] *See e.g.*, Docket No. FAA-2014-0481 at 12:

> "Manned aircraft are at risk of fuel spillage and fire in the event of an incident or accident. The Phantom 2 Vision+ carries no fuel, and therefore the risk of fire following an incident or accident due to fuel spillage is eliminated."

Part 21, Subpart H; Part 27; 45.23(b); 45.27(a); 61.113; 91.7(a); 91.9(b)(2); 91.9(c); 91.103; 91.109(a); 91.119; 91.121; 91.151(a); 91.203 (a) & (b); 91.405(a); 91.407(a)(1); 91.409(a)(1) & (2); 91.417 (a) & (b).

The exemption will enhance safety by reducing risk to the general public and property owners from the substantial hazards associated with performing equivalent forensic evaluation aerial inspections and surveys with conventional fixed-wing aircraft, rotorcraft, or other methods.

X. CONCLUSION

Rimkus' Petition for Exemption satisfies the criteria articulated in Section 333 of the Reform Act of 2012 including weight, speed, operating capabilities, proximity to airports and populated areas, operation within VLOS and national security. The proposed UAS operations will benefit the public as a whole by improving safety and reducing risk by alleviating human exposure to danger. In consideration of the foregoing, this Petition for Exemption provides the FAA with more than adequate justification for granting the requested exemptions allowing Rimkus to use UASs for aerial inspections and surveys during its forensic evaluations.

We thank you for your prompt consideration of our requested exemptions. Should you have any questions, or if you need any additional information to support the requested exemptions, please contact the undersigned or John McGraw at:

John McGraw Aerospace Consulting, LLC
Phone: 540-219-1638
Email: john@jmacaerospace.aero

Very truly yours,

/s/ Matthew J. Clark
Matthew J. Clark
Mark E. McKinnon
Counsel for Rimkus Consulting Group, Inc.

(The following attached items contain proprietary and commercial information exempt from disclosure under the Freedom of Information Act, 5 U.S.C. § 522 *et seq.*, and should be held in a separate file pursuant to 14 C.F.R. § 11.35(b)).

Attachments:

Rimkus UAS Flight Operations Manual

Rimkus Aircraft Flight Manual

DJI Phantom 2 Vision+ User Manual

Smart Flight Battery Safety Guidelines

Phantom 2 Vision+ Pilot Training Guide