

January 26, 2015

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

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

Dear Sir or Madam:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the “Reform Act”) and 14 C.F.R. Part 11, Douglas R. Dorrer, the Operator of a Small Unmanned Aircraft System (“sUAS”), including the 3D Robotics IRIS+ (“IRIS+”), seeks an exemption from the Federal Aviation Regulations (“FARs”) listed below and discussed in Appendix A.<sup>1</sup> Douglas R. Dorrer seeks exemption from the listed FARs to allow its use of the IRIS+ in commercial operations, such as educational community outreach, aerial real property and pre/post environmental remediation surveys, and not-for-profit Search and Rescue (SAR) operations supporting local law enforcement, so long as such operations are conducted within and under the conditions outlined herein or as established by the FAA in an exemption granted under either Section 333 or Section 49 U.S.C. § 44701(f).<sup>2</sup>

As discussed below, Douglas R. Dorrer is willing to abide by conditions the FAA has required in issuing recent Section 333 exemptions. This agreement on Douglas R. Dorrer’s part and the strong similarity of its operations to those approved in Exemptions 11109 and 11110 should give the FAA a basis for prompt consideration and processing of this request.

Douglas R. Dorrer is an employee of the National Aeronautics and Space Administration (NASA) which provides educational outreach to students throughout the sparsely populated State of West Virginia, a former FAA-licensed Air Traffic Controller, and a state-licensed Realtor® with several University degrees in Professional Aeronautics and Airway Sciences. He proposes to use a small, lightweight (less than 4.5lbs/2kg) UAV – the IRIS+ – and software to collect, process, and analyze aerial data principally for purposes of UAV educational outreach instruction, commercial aerial real property and pre/post environmental remediation surveying as well as not-for-profit Search and Rescue (SAR) operations supporting local law enforcement. Indeed, use of the IRIS+ would contribute to various social goods, from education through Science, Technology, Engineering, and Mathematics (STEM); to real property marketing and environmental protection; to emergency support of First Responders. In providing these services, Douglas R. Dorrer would empower students, law enforcement, and businessmen

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<sup>1</sup> See Pub. Law 112-95, 126 Stat. 11, § 333 (2012).

<sup>2</sup> Douglas R. Dorrer relies upon the following exemptions where specific reference to an exemption is not provided: Exemptions 11062 through 11067, 11080, 11109 through 11112, and 11114.

U.S. Department of Transportation  
January 26, 2015  
Page Two

to make better management decisions through software and cameras that identifies aerial perspectives of STEM initiatives, real property environmental conditions as well as life saving opportunities.

Operations under the exemption will be subject to strict operating requirements and conditions to ensure at least an equivalent level of safety to currently authorized operations using manned aircraft and under conditions as may be modified by the FAA as required by Section 333.<sup>3</sup>

As described more fully below, the requested exemption would authorize commercial operations using the IRIS+, which with a maximum take-off weight of less than 4.5 lbs. and is small in size. The IRIS+ will be operated under controlled conditions at low altitude in Class G airspace that is limited in scope, as described more fully herein; it will have automated control features, as described herein. The IRIS+ also will be operated by an individual formerly trained under FAA Order JO 7110.65<sup>4</sup> as an Air Traffic Controller (“ATC”)<sup>5</sup>, within the National Airspace System (“NAS”) with several aviation-related university degrees transversing education directly related to aircraft operations.<sup>6</sup> Finally, the Class G airspace in which the UAS will operate will be coordinated with the local Fixed-Based Operator (FBO) or ATC facility as applicable. Additionally, a Notice to Airmen (“NOTAM”) will be filed in accordance with FAA Order JO 7930.2P<sup>7</sup> prior to operations; if required.

Douglas R. Dorrer respectfully submits that because this small, unmanned aerial vehicle – the IRIS+ – will be used in lieu of comparatively hazardous operations now conducted with fixed wing and rotary conventional aircraft, the FAA can have confidence that the operations will achieve at least an equivalent level or greater level of safety. Approval of this exemption would thereby enhance safety and fulfill the Secretary of Transportation’s (the FAA Administrator’s) responsibilities under Section 333(c) of the Reform Act to “establish requirements for the safe operation of such aircraft systems in the national airspace system.”

The name and address of the applicant are:

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<sup>3</sup> While Douglas R. Dorrer is filing this exemption request on its own behalf, he anticipates that purchasers of the IRIS+ in the future will file exemption applications to allow them to operate the IRIS+ in commercial operations on their own. Those filings will be substantially similar to this exemption request.

<sup>4</sup> Reference FAA Order Jo 7110.65, *Air Traffic Control Handbook*

<sup>5</sup> See attached FAA license.

<sup>6</sup> See attached Embry-Riddle Aeronautical University transcripts.

<sup>7</sup> Reference FAA Order JO 7930.2P, *Notices to Airmen*.

The regulations from which the exemption is requested are as follows:

- 14 C.F.R. § 61.113(a) & (b);
- 14 C.F.R. § 61.133(a);
- 14 C.F.R. § 91.7(a);
- 14 C.F.R. § 91.119(c);
- 14 C.F.R. § 91.151(a);
- 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. § 91.417(a) & (b)

Appendix A discusses each rule listed above and explains why exemptions pursuant to the proposal set forth in this letter are appropriate, provide an equivalent level of safety, and are in the public interest. Appendix B provides the requisite *Federal Register* summary.

### **THE APPLICABLE LEGAL STANDARD UNDER SECTION 333**

Douglas R. Dorrer submits that grant of this exemption application for use of the IRIS+ in commercial and not-for-profit operations will advance the Congressional mandate in Section 333 of the Reform Act to accelerate the introduction of UASs into the NAS if it can be accomplished safely. This law directs the Secretary of Transportation to consider whether certain UASs may operate safely in the NAS before completion of the rulemaking required under Section 332 of the Reform Act. In making this determination, the Secretary is required to determine which types of UASs do not create a hazard to users of the NAS or the public or pose a threat to national security in light of the following:

- The UAS's size, weight, speed, and operational capability;
- Operation of the UAS in close proximity to airports and populated areas; and
- Operation of the UAS within visual line of sight of the Operator.

Reform Act § 333(a)(1). If the Secretary determines that such vehicles “may operate safely in the national airspace system, the Secretary shall establish requirements for the safe operation of such aircraft in the national airspace system.” *Id.* § 333(c) (emphasis added).<sup>8</sup>

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

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<sup>8</sup> Applicant submits that this provision places a duty on the Administrator to not only process applications for exemptions under Section 333, but for the Administrator, if he deems the conditions proposed herein require modification to allow approval, to supply conditions for the safe operation of the UAS. Douglas R. Dorrer welcomes the opportunity to consult with FAA staff in order to address any issues or concerns that this proposal may raise that they believe may require modification.

§ 40101 of the Act, from the requirement that all civil aircraft must have a current airworthiness certificate and those regulations requiring commercial pilots to operate aircraft in commercial service:

The Administrator may grant an exemption from a requirement of a regulation prescribed under subsection (a) or (b) of this section or any of Sections 44702-44716 of this title if the Administrator finds the exemption is in the public interest.

The grant of the requested exemption is in the public interest based on the clear direction in Section 333 of the Reform Act; the additional authority in the Federal Aviation Act, as amended; the strong equivalent level of safety surrounding the proposed operations; and the significant public benefit, including enhanced safety and cost savings associated with transitioning to UASs for aerial surveying. Accordingly, the applicant respectfully requests that the FAA grant the requested exemption without delay.<sup>9</sup>

## **AIRCRAFT AND EQUIVALENT LEVEL OF SAFETY**

The applicant proposes that the exemption requested herein apply to civil aircraft that have the characteristics and that operate with the limitations listed herein. These limitations provide for at least an equivalent or even higher level of safety to operations under the current regulatory structure because the proposed operations represent a safety enhancement to operations that would be conducted with conventional aircraft. These conditions are drawn from Exemptions 11062 through 11067, 11080, 11109, and 11110.

These limitations and conditions to which Douglas R. Dorrer (or “Operator”) agrees to be bound when conducting commercial operations under an FAA issued exemption include:

1. Operations of the IRIS+ are limited to the aircraft described in the attached manuals, which is a quadcopter (“Quad”) aircraft built by 3D Robotics, Inc. that weighs less than 4.5 pounds (the “UAV” or “UAS”). Proposed operations of any other operationally or technically similar aircraft shall be considered.
2. The UAV may not be flown at an indicated airspeed exceeding 25 knots.

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<sup>9</sup> In filing this application, Douglas R. Dorrer also is requesting that the FAA combine the grant of the Section 333 exemption with a stand-alone Certificate of Operation (“COA”) that will allow commercial operations of the IRIS+ without the necessity of filing for a COA for each flight. Compliance with the conditions agreed to herein and that may be imposed by the FAA, as set forth in prior Section 333 exemptions, provide the separation needed from other aircraft. NOTAM and notice to air traffic control can be provided by the filing of a NOTAM as set forth within the proposed conditions.

3. The UAV may be operated at an altitude of no more than 150 feet above ground level (“AGL”), as indicated by the procedures specified in the attached manuals. All altitudes reported to ATC must be in feet AGL.
4. The UAV must be operated within visual line of sight (“VLOS”) of the Operator.
5. All operations must utilize a visual observer (“VO”). The VO may be used to satisfy the VLOS requirement as long as the Operator always maintains VLOS capability. The VO and Operator must be able to communicate verbally at all times. The Operator must be designated before the flight and cannot transfer his or her designation for the duration of the flight. The Operator must ensure that the VO can perform the functions prescribed in the Operator’s manual.
6. The manuals must be amended to include all conditions and limitations required by the FAA. The manuals must be maintained and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in the exemption and the procedures outlined in the manuals, the conditions and limitations in the exemption take precedence and must be followed. Otherwise, the Operator must follow the procedures as outlined in the manuals.

The Operator may update or revise the manuals. It is the Operator’s responsibility to track such revisions and present updated and revised documents to the Administrator upon request. The Operator must also present updated and revised documents if it petitions for an extension or amendment of this 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 amendment to its exemption.

7. Prior to each flight, the Operator must inspect the UAS to ensure it is in a condition for safe flight. 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. The ground control station must be included in the preflight inspection. All maintenance and alterations must be properly documented in the aircraft records.
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 in accordance with the Operator’s manual. The Operator who conducts the functional test flight must make an entry in the UAS aircraft records of the flight. The manuals include this requirement.
9. The preflight inspection section in the manuals includes the following requirement: the preflight inspection must account for all discrepancies, *i.e.*, inoperable

components, items, or equipment, not covered in the relevant preflight inspection sections of the Operator's manual.

10. The Operator must follow 3D Robotics IRIS+ aircraft/component, maintenance, overhaul, replacement, inspection, and life limit requirements, with particular attention to flight critical components that may not be addressed in the manufacturer's manuals.

11. All maintenance and aircraft inspections shall be completed in accordance with the manuals. A iterations must be noted in the aircraft logbook, including total flight hours, description of work accomplished, and the signature of the authorized technician returning the UAS to service.

13. Each UAS operated under the exemption must comply with all 3D Robotics system and safety bulletins.

14. Operator's maintenance personnel must make a record entry in the UAS logbook or equivalent document of the corrective action taken against discrepancies discovered between inspections.

15. The Operator is not required to obtain a private pilot certificate or a third-class airman medical certificate in accordance with 14 CFR Part 103.<sup>10</sup>

16. The Operator shall 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 people, vessels, vehicles, and structures.

17. The Operator shall only operate the UAS in the immediate vicinity of the subject educational outreach, aerial real property or environmental surveys, or within designated SAR operations with First Responder oversight.

18. The Operator shall conspicuously post signage indicating UAS operations are in progress and to remain clear.<sup>11</sup>

19. If the UAS loses communications or loses its GPS signal, the UAS must return to a pre-determined location within the private or controlled-access property and land or be recovered in accordance with the manuals.

20. The Operator must abort the flight in the event of unpredicted obstacles or emergencies in accordance with the manuals.

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<sup>10</sup> See Reference 14 CFR 103, *Ultralight Vehicles*

<sup>11</sup> See Attached Proposed Sign

21. The Operator is prohibited from beginning a UAS 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, to fly after that for at least 10 minutes.
22. The Operator will file a request for a Notice to Airmen (NOTAM) not more than 72 hours in advance, but not less than 48 hours prior to the operation.
23. Before conducting operations, the radio frequency spectrum used for operation and control of the UA must comply with the Federal Communications Commission (“FCC”) or other appropriate government oversight agency requirements.
24. The Operator and VO shall monitor ATC emergency radio frequencies VHF 121.5 Mhz or UHF 243.0 Mhz.
25. The documents required under 14 C.F.R. 91.9 and 91.203 must be available to the Operator 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.
26. The UAS must 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 may not be operated by the Operator from any moving device or vehicle.
28. All operations shall be conducted in Class G airspace 150 feet or less AGL.
29. All operations must be conducted under visual meteorological conditions (“VMC”). The UAS 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 Operator.
30. During operations in Class G airspace, the UAS may not operate within 5 nautical miles of the geographic center of an airport as denoted on a current FAA-published aeronautical chart unless a Letter of Agreement with that airport’s management is obtained, and the operation is conducted in accordance with a NOTAM as required by the Operator’s COA. The letter of agreement with the airport management must be made available to the Administrator upon request.

30. The UAS may not be operated over congested or densely populated areas unless the conditions set forth in #31 are satisfied. These populated areas include, but are not limited to, the yellow areas depicted on World Aeronautical Charts (“WAC”), Sectional Aeronautical Charts (“Sectionals”), or Terminal Area Charts (“TAC”). However, aeronautical charts may not reflect pertinent local information. Ultimately, it is the Operator’s responsibility to maintain the minimum safe altitudes required by § 91.119.

31. Operations must be conducted at least 150 feet from all nonparticipating persons (person’s other than the Operator or VO), vessels, vehicles, and structures unless:

a. Barriers or structures are present that sufficiently protect nonparticipating persons from debris in the event of an accident. The Operator must ensure that nonparticipating persons remain under such protection. If a situation arises in which nonparticipating persons leave such protection and are within 150 feet of the UAS, flight operations must cease immediately; and/or

b. the aircraft is operated near vessels, vehicles, or structures where the land owner/controller has granted permission and the Operator has made a safety assessment of the risk of operating closer to those objects; and

c. operations near the Operator or VO do not present an undue hazard to the Operator or VO, per § 91.119(a).

32. 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.

33. In the event COAs are required, 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.nts.gov](http://www.nts.gov).

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**Privacy.** All flights will occur over private or controlled access property with the property owner’s prior consent and knowledge. Inspection will be in areas where the owners will have consented to the inspections or otherwise have agreed to allow the UAS and the Operator to be in the area where inspection will take place.



**National Security.** No national security issue is raised by the grant of this exemption. Given the size, load carrying capacity, speed at which it operates, and the fact that it carries no explosives or other dangerous materials, the IRIS+ poses no threat to national security.

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**In summary,** Douglas R. Dorrer seeks an exemption from the FARs set forth in Appendix A to operate commercially a small unmanned vehicle (4.5lbs. or less) in educational outreach, aerial real property and pre/post environmental remediation surveys as well as not-for-profit Search and Rescue operations.

Approval of this exemption for commercial operations will enhance safety by reducing risk. Conventional operations, using jet or piston powered aircraft, operate at extremely low altitudes just feet from the subject being inspected and in extreme proximity to people and structures. Such manned operations present the risks associated with vehicles that weigh in excess of 6,000 lbs., carrying large amounts of jet A or other fuel. Such aircraft must fly to and from the project location. In contrast, a sUAS weighing fewer than 4.5 lbs. and powered by batteries eliminates virtually all of that risk given the reduced mass and lack of combustible fuel carried on board. The sUAS is carried to the target area and not flown. The sUAS will carry no passengers or crew and, therefore, will not expose them to the risks associated with manned aircraft flights.

The operation of small UASs, weighing less than 4.5 lbs., conducted in the strict conditions outlined above, will provide an equivalent level of safety supporting the grant of the exemptions requested herein. These lightweight aircraft operate at slow speeds, close to the ground, and in sparsely-populated West Virginia Class G airspace not under the authority of ATC<sup>12</sup>. As a result, they are far safer than conventional operations conducted with manned aircraft operating in close proximity to the ground and people.

Satisfaction of the criteria provided in Section 333 of the Reform Act of 2012 – size, weight, speed, operating capabilities, proximity to airports and populated areas, and operation within visual line of sight and national security – provide more than adequate justification for the grant of the requested exemptions allowing commercial operation of applicant’s UAS for the Purposes outlined herein and are consistent with exemptions already granted, including Exemptions 11062 through 11067, 11080, 11109 through 11112, and 11114.

Sincerely,



Douglas R. Dorrer, MBA, Pro Se

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<sup>12</sup> FAA Order JO 7110.65v – Chapter 12.1.1.2, *Airspace Classification, Class G* - Uncontrolled airspace within which ATC has neither the authority nor responsibility for exercising control over air traffic.

## APPENDIX A

### **EXEMPTION REQUEST AND EQUIVALENT LEVEL OF SAFETY SHOWINGS UNDER APPLICABLE RULES SUBJECT TO EXEMPTION**

Douglas R. Dorrer requests an exemption from the following regulations as well as any additional regulations that may technically apply to the operation of the IRIS+:

#### **14 C.F.R. § 61.113(a) & (b); 61.133(a): Private Pilot Privileges and Limitations; Pilot in Command; Commercial Pilot Privileges and Limitations.**

Section 61.113(a) & (b) limit private pilots to non-commercial operations. Unlike a conventional aircraft that carries a pilot, passengers, and cargo, the IRIS+ in this case is remotely controlled with no passengers or property of others on board. Section 61.133(a) requires an individual with a commercial pilot's license to be pilot in command of any aircraft for compensation or hire. Douglas R. Dorrer respectfully proposes that Operator requirements should take into account the characteristics of the particular UAS. Douglas R. Dorrer's IRIS+ has a high degree of pre-programmed control and various built-in technical capabilities that strictly limit the potential for operation outside of the operating conditions set forth in the exemption application.

The IRIS+ has an autonomous navigation and control system. Flights are pre-programmed with precision GPS guidance and do not require human intervention. In the case of unplanned events, the Operator can manually intervene to take one of the following actions:

- (i) command the aircraft to begin to autonomously return to the recovery area and land;
- (ii) command the aircraft to autonomously return to the recovery area where the pilot will assume control and land the aircraft; or (iii) manually assume control of the aircraft via the hand controller and return the craft to the recovery area where the Operator lands it.

Additional automated safety functions and safety enhancing features of the IRIS+ include the following:

- Auto-pilot detection of lost GPS or of insufficient satellites initiates a stand-by loiter pattern until such time as GPS is re-established or the PIC assumes manual control of the aircraft.
- Low battery power on the aircraft (10.4 volts) triggers the landing sequence and the craft will fly to the recovery area.
- If the auto-pilot detects a lost-link to the ground control station for longer than 30 seconds, landing procedure begins.
- The aircraft, weighing fewer than 4.5 lbs., fully loaded, is constructed of plastic, which is intended to absorb impact energy.
- In the event the ground station reaches a low power state, it will alert the pilot.

The FAA has long-established regulations found in 14 CFR 103 (“Part 103”) that do not require an operator of Ultralight Vehicles weighing less than 254 lbs to obtain an airman or medical certificate:

### **1. § 103.7 Certification and registration.**

(b) Notwithstanding any other section pertaining to airman certification, operators of ultralight vehicles are not required to meet any aeronautical knowledge, age, or experience requirements to operate those vehicles or to have airman or medical certificates.

### **2. Interim Operational Approval Guidance 08-01 <sup>1</sup>**

**9.1.1.1** Operations not requiring a pilot certificate: The PIC may not be required to hold a pilot certificate for operations approved and conducted solely within visual line of sight in Class G airspace. For the PIC to be exempt from the pilot certificate requirement the following conditions must exist and the alternate compliance method described below must be followed:

- The operation is conducted in a sparsely populated location, and,
- The operation is conducted from a privately owned airfield, military installation, or off-airport location.
- Visual line of sight operations conducted no further than 1 NM laterally from the UAS pilot and at an altitude of no more than 400 feet above ground level (AGL) at all times.
- Operations shall be conducted during daylight hours only.
- Operations shall be conducted no closer than 5 NM from any airport or heliport.

Given these safety features as well as established FAA regulatory guidance, Douglas R. Dorrer proposes that Operators of the IRIS+ should not be required to hold an airmen or medical certification.

The risks associated with the operation of the IRIS+ (given its size, speed, operational capabilities, and lack of combustible fuel) are so diminished from the level of risk associated with commercial operations contemplated by Part 61 with conventional aircraft (fixed wing or rotorcraft) that allowing operations of the UAS as set forth above meets or exceeds the present level of safety provided under 14 C.F.R. § 61.113(a) & (b) and does not rise to the level of requiring a commercial pilot to operate the aircraft under § 61.133(a).

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<sup>1</sup> See Reference Interim Operational Approval Guidance 08-01; *Unmanned Aircraft Systems Operations in the U. S. National Airspace System*, 2008.

Given these conditions and restrictions, an equivalent level of safety will be provided by allowing operation of the IRIS+ without a private pilot's certificate, under the conditions set forth in the exemption request. The FAA has granted exemptions to conduct similar operations in Exemptions 11062 through 11067, 11080, 11109, and 11110.

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

This regulation requires that no person may operate a civil aircraft unless it is in airworthy condition. Should the exemption be granted allowing commercial operation of the IRIS+ without an airworthiness certificate, no standard will exist for airworthiness of the IRIS+. Given the size of the aircraft and the requirements that the Operator has agreed to as relates to airworthiness, as set forth in the attached manuals, an equivalent level of safety will be achieved by ensuring compliance with the 3D Robotics manuals prior to each flight. The FAA has granted exemptions to conduct similar operations in Exemptions 11062 through 11067, 11080, 11109, and 11110.

Furthermore, 14 CFR 103.7 (a) , Ultralight Vehicles weighing less than 254 lbs. do not require an airworthiness certificate.

(a) Notwithstanding any other section pertaining to certification of aircraft or their parts or equipment, ultralight vehicles and their component parts and equipment are not required to meet the airworthiness certification standards specified for aircraft or to have certificates of airworthiness.

#### **14 C.F.R. § 91.119(c): Minimum Safe Altitudes.**

Section 91.119 establishes safe altitudes for operation of civil aircraft. Specifically, 91.119(c) limits aircraft flying over areas other than congested areas to an altitude of 500 feet above the surface, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure.

As set forth herein, the IRIS+ will never operate at higher than 150 feet AGL. It will, however, be operated to avoid congested or populated areas that are depicted in yellow on VFR sectional charts. Because aerial survey work must be accomplished at relatively low altitudes and at altitudes less than 500 feet AGL, an exemption from Section 91.119(c) is needed.

The equivalent level of safety will be achieved given the size, weight, speed, and material with which the IRIS+ is built. Also, no flight will be taken without the permission of the landowner or those who control the land as well as local officials. Because of advance notice to the landowner, all affected individuals will be aware of the survey flights. Compared to aerial survey operations conducted with aircraft or rotorcraft weighing far more than 4.5 lbs. and carrying flammable fuel, any risk associated with these operations will be far less than the risks currently posed by conventional aircraft operating at or below 500 feet AGL. Indeed, the low-altitude operations of the UAS will maintain separation between these small-UAS operations and the operations of conventional aircraft that must comply with Section 91.119. The FAA has granted exemptions to conduct similar operations in Exemptions 11062 through 11067, 11080, and 11110.

Douglas R. Dorrer further believes that ATC does not have the authority to control aircraft within Class G airspace according to FAA Order JO 7110.65v.

12.1.1.2-*Airspace Classification; Class G* - Uncontrolled airspace within which ATC has neither the authority nor responsibility for exercising control over air traffic. (Emphasis Noted)

Furthermore, while operating within Class G airspace under the doctrine of “*See and Avoid*” in accordance with 14 CFR 91.113- *Right of Way Rules*, manned-aircraft must give way to a lesser maneuverable or unmanned aircraft. A 4.5lb. UAS and a piloted fuel-powered aircraft are obviously not of the same category.

(b) *General*. When weather conditions permit, regardless of whether an operation is conducted under instrument flight rules or visual flight rules, vigilance shall be maintained by each person operating an aircraft so as to see and avoid other aircraft.

(d) *Converging*. When aircraft of the same category are converging at approximately the same altitude (except head-on, or nearly so), the aircraft to the other's right has the right-of-way. If the aircraft are of different categories—

- (1) A balloon has the right-of-way over any other category of aircraft;
- (2) A glider has the right-of-way over an airship, powered parachute, weight-shift-control aircraft, airplane, or rotorcraft.
- (3) An airship has the right-of-way over a powered parachute, weight-shift-control aircraft, airplane, or rotorcraft.

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

This regulation prohibits an individual from beginning “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.”

The batteries powering the IRIS+ provide approximately 10-15 minutes of powered flight. Without an exemption from § 14 C.F.R. 91.151, the UAS’s flights would be limited to approximately 5-7 minutes in length. Given the limitations on its proposed operations and the location of those proposed operations, a longer time frame for flight in daylight VFR conditions is reasonable.

Douglas R. Dorrer believes that an exemption from 14 C.F.R. § 91.151(a) is safe and within the scope of prior exemptions. *See* Exemption 10673 (allowing Lockheed Martin Corporation to operate without compliance with 91.151(a)). Operating the small UAS without 5-7 minutes of reserve fuel does not engender the type of risks that Section 91.151(a) was meant to prevent given the size and speed at which the UAS operates. The fact that it carries no pilot, passenger, or cargo also enhances its safety. Limiting IRIS+ flights to 5-7 minutes would greatly reduce their utility. In the unlikely event that the IRIS+ achieves a low battery state (10.4 volts), it would simply land. Given its weight and construction material, the risks are less than

contemplated by the current regulation.

Douglas R. Dorrer believes that an equivalent level of safety can be achieved by maintaining 5 minutes of battery life, which, allowing 15 minutes of flight time, would be more than adequate to return the UAS to its planned landing zone from anywhere in its operating area.

Similar exemptions have been granted to other Operators, including Exemptions 2689F, 5745, 10673, 10808, and Exemptions 11062 through 11067, 11080, 11109, 11110, and 11112.

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

Section 91.405(a) requires that an aircraft Operator or owner “shall have that 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 . . . .” Section 91.407 similarly makes reference to requirements in Part 43; Section 91.409(a)(2) requires an annual inspection for the issuance of an airworthiness certificate. Section 91.417(a) requires the owner or Operator to keep records showing certain maintenance work that has been accomplished by certificated mechanics, under Part 43, or licensed pilots and records of approval of the aircraft for return to service.

Maintenance of the IRIS+ will be accomplished by the owner/Operator pursuant to the manuals attached as confidential exhibits. An equivalent level of safety will be achieved because the UAS is small in size, will carry a small payload, will operation only in restricted predetermined areas and is not a complex mechanical device. As provided in the attached manuals, the Operator will ensure that the UAS is in working order prior to initiating flight, perform required maintenance, and keep a log of any maintenance that is performed; moreover, the Operator is the person most familiar with the aircraft and is best suited to maintain the aircraft in an airworthy condition and to ensure an equivalent level of safety. The FAA has granted exemptions for similar operations in Exemptions 11062 through 11067, 11080, 11109, 11110, and 11112.

## APPENDIX B

### **SUMMARY OF DOUGLAS R. DORRER SECTION 333 EXEMPTION REQUEST**

For publication in the *Federal Register*, Douglas R. Dorrer hereby provides pursuant to Part 11 a summary of its exemption application to allow commercial operation of the IRIS+ unmanned aircraft in educational outreach, aerial real property and pre/post environmental remediation survey work as well as not-for-profit search and rescue operations. An exemption is requested from the following regulations:

14 C.F.R. § 61.113(a) & (b);

14 C.F.R. § 61.133(a);

14 C.F.R. § 91.7(a);

14 C.F.R. § 91.119(c);

14 C.F.R. § 91.151(a);

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. § 91.417(a) & (b)