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

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

April 29, 2015

Exemption No. 11447
Regulatory Docket No. FAA−2014−1010

Mr. Philip Owen
Director of UAS Operations
enrGies, Inc.
7220 Governors West
Huntsville, AL 35806

Mr. L. Steven Pierce
President
enrGies, Inc.
7220 Governors West
Huntsville, AL 35806

Dear Mr. Owen and Mr. Pierce:

This letter is to inform you that we have granted your request for exemption. It transmits our decision, explains its basis, and gives you the conditions and limitations of the exemption, including the date it ends.

By letters dated December 2, 2014, and March 26, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of enrGies, Inc. (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial video and data gathering.

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 the Lockheed Martin Indago.[1]

The petitioner requested relief from 14 CFR part 21, C*ertification 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, 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.

[1] By letter dated March 26, 2015, the petitioner added the following aircraft to its proposed operations - the Lockheed Martin Desert Hawk III, DJI Phantom Vision +, Precision Lancaster MK3, Aeromao Talon, Aeromao Aeromapper 300, Aeromao Aeromapper EV-2, and the DJI Inspire. The FAA must conduct an assessment on these aircraft, which also includes a finding that the proposed UAS meet the conditions in Section 333 of Public Law 112−95. When the FAA completes its review, we will proceed accordingly and no further action will be required by the petitioner.

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, enrGies, 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, enrGies, 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 Lockheed Martin Indago 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

March 26, 2015

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

Re**: Modification** to Exemption Request Section 333 of the FAA FMRA and Part 11 of the Federal Aviation Regulations submitted **5 Dec 2014**

Dear Sir or Madam:

Pursuant to Section 333 of the FAA Modernization and FMRA of 2012 (FMRA), enrGies Inc. (the "petitioner."), a service provider of Small Unmanned Aircraft Systems (sUAS) services and operations for multiple government activities; seeks an exemption from Federal Aviation Regulations ("FARs") listed below. The requested exemption would allow enrGies Inc. to conduct research and commercial activities using sUAS in the National Airspace System (NAS). These operations would be conducted under strict guide lines and control ensuring safe operations and will be conducted within and under the conditions outlined herein or as may be established by the FAA as required by Section 333.

As described below, the requested exemption would authorize enrGies Inc. to perform commercial sUAS operations within the NAS utilizing a variety of airframes, sensors and payloads that will provide the following benefits:

1. Commercial use of sUAS to perform aerial video and data gathering in support of federal, state and local government agencies as well as the following private commercial ventures: basic photography, precision agriculture, pipeline/power line transmission/distribution towers, oil and gas facilities (on & off shore), manmade/natural disaster damage assessment, support to first responders, security, construction, research, wildlife and wildfire monitoring, real estate, local infrastructure, railroad infrastructure, surveying, scientific studies, insurance functions, training, mining and UAS research and development. All of these activities are critical to the well-being of the general public.
2. The use of sUAS will decrease congestion in the NAS along with reducing the noise/air pollution generated during traditional manned aircraft flight operations.
3. Operation of sUAS may substantially reduce the risk to life and property by performing missions that are currently being performed by manned aircraft that are considered dangerous (i.e., transmission tower inspections or operating in extreme terrain or weather conditions).

4. sUAS when operated properly and under the FAA guidelines will not pose a risk to National Security or generate new privacy issues.

enrGies Inc. is requesting the approval to fly eight different systems, both fixed-wing and multi-rotor. Our pilots are currently certified in both type systems and must maintain currency in accordance with our government certified flight procedures. A data sheet for each system is provided as well as all manuals and documents.

Approval of this exemption would thereby enhance safety and fulfill the Secretary of Transportation's responsibilities under Section 333(c) of the FMRA to "establish requirements for the safe operation of such aircraft systems in the national airspace system." The following exhibits are submitted as amplifying information to provide substantiation of enrGies credentials and technical information regarding the sUAS pursuant to this request. [1]

A – enrGies Inc. Flight Operations Procedures;
B – Lockheed Martin Indago Multi-rotor
C – Lockheed Martin Desert Hawk III;
D – DJI Phantom 2 vision +
F – PrecisionHawk Lancaster MK3
G – Aeromao Talon
H – Aeromao Aeromapper 300
I – Aeromao Aeromapper EV-2
J – DJI Inspire

The regulations from which the exemption is requested are:

14 C.F.R. Part 21;

14 C.F.R. 45.23(b);

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. 91.9(b)(2) & (c);

14 C.F.R. 91.103;

[1] Petitioner submits Exhibits A-J, as a Confidential documents under 14 CFR § 11.35(b), as the documents contain confidential commercial and proprietary information that the Petitioner has not and will not share with others. The Manuals contain operating conditions and procedures that are not available to the public and are protected from release under the Freedom of information Act 5 U.S.C. § 552 et.seq.

14 C.F.R. 91.109(a);

14 C.F.R. 91.119;

14 C.F.R. 91.121;

14 C.F.R. 91.151(a);

14 C.F.R. 91.203(a) & (b);

14 C.F.R. 91.405(a);

14 C.F.R. 91.407(a)(1);

14 C.F.R. 91.409(a)(2);

14 C.F.R. 91.417(a)

enrGies Inc. point of contact name and address:

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DESCRIPTION OF PETITIONER

enrGies originated as an aviation engineering company supporting the U.S. Army, therefore an aviation perspective and its discipline forms the basis of our corporate culture. Our aviation culture including safety, standardized qualifications, and awareness of the responsibilities resulting from sharing the national airspace form the cornerstone of all operations and business activities. Naturally, this corporate culture formed the basis and mandate for all sUAS operations.

enrGies personnel have been providing UAS support to the Department of Defense, the Department of Energy, and Department of State for many years. In fact, enrGies provided the initial training and subject matter expert support for the Department of Interior UAS program; including assisting the United States Geological Survey (USGS) stand up their sUAS program. This assistance included teaching their basic pilot courses and providing pilots and operational support for their first 7 missions. enrGies has provided basic and advanced flight training to the US Army and Special Operations forces for last four years, including Program of Instruction development. .

enrGies sUAS Pilots/Instructors have 1000's of sUAS flight hours of operations and student instruction throughout the world, including: the US Mainland, Alaska, Hawaii, Mexico, Korea, Germany, Italy, Lebanon, Kuwait, Iraq and Afghanistan. All our current

Pilots/Instructors have military experience (many are retired military). Several enrGies sUAS pilots also hold FAA Commercial certificates. This background gives enrGies a strong safety orientated focus.

enrGies is currently working with multiple major sUAS OEMs through teaming or partnership agreements and are conducting training on several of the systems listed for the US Military over restricted airspace. We are also assisting several universities to develop their sUAS programs.

Relevant Statutory Authority

This petition for exemption is submitted to fulfill Congress' goal in passing Section 333(a) through (c) of the Reform Act. In the Reform Act, Congress directed the FAA "to safely accelerate the integration of civil unmanned aircraft systems into the national airspace system" and, under Section 333 of that law, directed the Secretary of Transportation ("FAA Administrator") to consider whether certain unmanned aircraft systems may operate safely in the National Airspace System ("NAS") before completion of the rulemaking required under Section 332 of the Reform Act.

In making this determination, the Secretary shall determine, at a minimum:

(1) which types of unmanned aircraft systems, if any, as a result of their size, weight, speed, and operational capability, proximity to airports and populated areas; and operation within visual line of sight do not create a hazard to users of the national airspace system or the public or pose a threat to national security; and
(2) whether a certificate of waiver, certificate of authorization, or airworthiness certification under section 44704 of title 49, United States Code is required for the operation of unmanned aircraft systems identified under paragraph (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".[2]

In addition, the FAA Administrator has general authority to grant exemptions from its safety regulations and minimum standards when the Administrator decides a requested exemption is in the public interest. See 49 U.S.C. § 44701(f) (authorizing the grant of exemptions from a requirement of regulations prescribed pursuant to section 44701(a)-(b) and sections 44702-44716). A party requesting an exemption must explain the reasons why the exemption: (1) would benefit the public as a whole, and; (2) would not

[2] Section 333 places the duty on the Administrator, *inter alia,* to craft conditions for the safe operation of the UAS, if it should be determined that the conditions set forth herein do not fulfill the statutory requirements for approval.

adversely affect safety (or how it would provide a level of safety at least equal to the existing rules). See 14 CFR § 11.81; FAA, Petition for Exemptions.

A. enrGies will utilize battery powered rotorcraft, multi-rotor and fixed wing aircraft, each weighing less than 55 lbs., including payload. Specific details regarding each air platform are included in Exhibits B - I, and a summary is shown with Exhibit A. These systems will operate, under normal conditions, at a speed of no more than 87 knots. Operations will be performed by a qualified sUAS Pilot in Command (PIC), as outlined below, to insure that safety of the NAS and the public in general are paramount. Given the small size of the sUAS involved, the pre-planned environment within which they will operate, and the level of qualification and training enrGies pilots provide, enrGies believes that these operations will provide greater than an “equivalent level of safety”.

   The operation of sUAS by knowledgeable and professional pilots will serve to enhance safety, add to the public benefit, and reduce the environmental impact related to current methods of manned aircraft flight operations will "not create a hazard to users of the NAS or the public."

B. Flight Operating Procedures (FOP) (Exhibit A), prescribes the policies and procedures for enrGies proposed sUAS operations. To assist the FAA in its safety assessment of EnrGies proposed sUAS operations, a summary of operational limitations and conditions that ensure an equivalent or greater levels of operational safety are provided below.

   Safety will be the first and foremost consideration in all aspects of enrGies sUAS program. All flight operations will comply with all OEM, FAA or enrGies safety bulletins.

   1. The sUAS PIC will have, at a minimum, a third class medical certificate and hold the minimum FAA required certificate, or higher and comply with flight review requirements specified in 14 CFR § 61.56 or FAA recognized equivalent.
   2. To become a sUAS PIC, the pilot must be qualified on the sUAS, pass a written test, oral evaluation and formal flight examination for each system. The PIC will receive a formal evaluation and a minimum of one no-notice evaluation every 12 months.
   3. All pilot training and evaluations will be documented and kept in the pilots permanent flight record. All flights will be logged in the pilots log book and the aircraft log book.
   4. The sUAS PIC is responsible for the safe operations of the system under

their control. The PIC can only operate one system at a time, and PICs cannot change in the middle of the flight.

5. The PIC will ensure that all required documentation, regarding the sUAS and flight crew, are on-site during UAS operations.
6. Flight planning requires flight completion with at least 10% battery power remaining as measured by the sUAS or appropriate timing.
7. A briefing will be conducted in regard to the planned sUAS operations prior to flight at each new location. All personnel who will be performing duties within the boundaries of the area of operation will attend.
8. All sUAS flights will have the minimum flight crew required (as directed in the pilots manual) and a trained observer to ensure the sUAS remains in VLOS at all times. The observer must use human vision, unaided by any devise other than corrective lenses. The PIC and observer must be able to communicate verbally at all times. Electronic devices may be used with the exception electronic messaging or texting.
9. Prior to each flight, the PIC will conduct a complete pre-flight IAW the Pilots Manual and will not fly the aircraft if any discrepancy is found that could affect the safety of the flight.
10. The PIC will follow all published emergency procedures when encountered, with safety of the public being the primary focus.
11. The sUAS will be operated at or below 400' AGL
12. The sUAS will not operate at a speed of greater than 87 knots.
13. The sUAS will not be operated night (official sunrise to official sunset)
14. Flights will be operated under visibility and cloud clearance requirements equivalent to Visual Flight Rules (VFR). sUAS operations are not authorized under Special VFR conditions.
15. Flights will be operated in Class G airspace whenever possible. Flights are not authorized in Class A airspace. Flights within 5 nautical miles of an airport are not authorized unless a letter of agreement is obtain from the airport manager or permitted by appropriate COA.
16. The sUAS will remain clear of and give way to any manned aircraft.
17. Prior to a sUAS flight, an area of operation will be established. This area of operation will include a defined lateral and vertical area, where the sUAS will operate. Safety procedures will be established for persons, property and applicable airspace within the area of operation.
18. The sUAS shall operate from on-site takeoff/landing locations adjacent to the PIC and/or Observer.
19. All operations shall be conducted over private or controlled-access property with permission from the property owner/controller or authorized representative.

C. It is enrGies Inc.'s belief that the size, weight, speed, operating environment, system capabilities and extensive PIC training and experience provide greater than the equivalent level of safety when operating a sUAS and that it is in the public interest as outlined in Section 333 of the FMRA. It is requested that the FAA issue an exemption to permit safe, legal, commercial sUAS operation by enrGies Inc. as soon as possible.

Respectfully submitted,

Philip A. Owen
Director of UAS Operations

L. Steven Pierce
President

EXEMPTION REQUESTS AND EQUIVALENT LEVEL OF SAFETY

The applicant requests an exemption from the following regulations as well as any additional regulations that may technically apply to the operation of sUAS's:

14 CFR Part 21, Subpart H: Airworthiness Certificates 14 CFR § 91.203(a)(1)

> Section 91.203(a)(1) requires all civil aircraft to have a certificate of airworthiness. Part 21, Subpart H, entitled Airworthiness Certificates, establishes the procedural requirements for the issuance of airworthiness certificates as required by FAR § 91.203(a)(1).

Given the size of the aircraft (less than 55 lbs.) and the limited operating area associated with its utilization, it is unnecessary to go through the certificate of airworthiness process under Part 21 Subpart H to achieve or exceed current safety levels.

Such an exemption meets the requirements of an equivalent level of safety under Part 11 and Section 333 of the Reform Act. The Federal Aviation Act and Section 333 of the Reform Act both authorize the FAA to exempt aircraft from the requirement for an airworthiness certificate, upon consideration of the size, weight, speed, operational capability, and proximity to airports and populated areas of the sUAS involved.

In this case, an analysis of these criteria demonstrates that the sUAS operated without an airworthiness certificate, under the conditions proposed herein, will be at least as safe, or safer, than a conventional aircraft (fixed wing or rotorcraft) with an airworthiness certificate. The sUAS weighs less than 55 lbs. fully loaded. It will not carry a pilot or passenger, will not carry flammable fuel, and will operate exclusively within an area pre-disclosed and in compliance with conditions set forth herein. Operations under this exemption will be tightly controlled and monitored by both the pilot, pursuant to the conditions set forth above, and by local public safety requirements. The FAA will have advance notice of all operations through the filing of NOTAMs. Receipt of the prior permission of the land owner, the size of the aircraft, the lack of flammable fuel, and the fact that the aircraft is carried to the location and not flown there all establish the equivalent level of safety. The sUAS provides at least an equivalent, and most likely exceeds, level of safety to that of such operations being conducted with conventional aircraft that would be orders-of-magnitude larger and would be carrying passengers, cargo, and flammable fuel.

14 CFR. § 45.23 & 91.9(c): Marking of the Aircraft

Regulation 45.23 provides:

> (a) Each pilot of an aircraft must display on that aircraft marks consisting of the Roman capital letter "N" (denoting United States registration) followed by the

registration number of the aircraft. Each suffix letter used in the marks displayed must also be a Roman capital letter.

(b) 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 pilot 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.

Regulation 91.9(c) provides:

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

The sUAS has no entrance to the cabin, cockpit, or pilot station on which the markings can be placed. Given the size of the sUAS, two-inch lettering will be impossible. Official marking systems for sUAS have not yet been established for operations inside the NAS. The applicant is prepared to mark the sUAS with the name of the organization and location or origin and fulfill any other request by the FAA to this topic in accordance to § 45.29(f) where the pilot, observer, and others working with the sUAS will see the identification of the sUAS.

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

14 CFR § 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 sUAS 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 an aircraft for compensation or hire. The applicant respectfully proposes that pilot requirements should take into account the characteristics of the particular sUAS. Most sUAS autopilot’s have 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. Hands-on experience with the sUAS are a far more effective guarantee of flight safety than a commercial pilot certificate would be, until the FAA Pilot Certificate requirements catch up to the sUAS technology.

The sUAS autopilots have an all-digital software platform with advanced features previously restricted to full size unmanned aircraft. Automated features and

advanced fly-safe controls enable safe, reliable operation, as well as advanced networking capabilities and system extensibility.

- The system can autonomously fly a programmed flight path or fly in manual mode

- Flight time and battery minutes are displayed at all times. The system will return home and land automatically if user-configurable limits are reached.

- Flight safety is a priority, no matter the operating environment or project. sUAS offer superior safety over manned aircraft by removing the need for people to be onboard in potentially dangerous situations. With multiple built-in safety features, sUAS platforms lead manned operations with respect to safety.

- The sUAS automatically detects potential issues - with configurable automated response behavior such as a return-home-and-land routine

- The sUAS self-calibrate all of their sensors and perform required failsafe pre-flight tests prior to takeoff to check for errors

- The sUAS have the ability to set up visual no-fly zones or create a virtual fence so the sUAS can’t fly horizontally or vertically beyond the pre-planned flight area

- The sUAS have battery minutes and flight time displayed at all times. The system will return home and land automatically if user-configurable limits are reached

- The sUAS auto detect a lost GPS, warns the pilot and initiates an immediate landing.

- Low battery on the sUAS triggers a Non-Fatal Warning alarm to return home, land and replace the battery

- If sUAS detect a lost-link to the Ground Station the vehicle will perform its pre-defined Non-Fatal Condition Response.

Given these safety features, the applicant proposes that pilots of sUAS with these features should not be required to hold a commercial or private pilot certification. Instead, pilots should be required to:

- Have successfully completed, at a minimum, FAA private pilot ground instruction and passed the FAA Private Pilot written examination or FAA-recognized equivalents including ICAO issued commercial, private license and ground school; pilots will therefore receive instruction in aeronautical navigation, meteorology, and aviation regulations prior to conducting commercial sUAS operations.

- Have completed a training program for operation of the sUAS.

- Have completed 10 hours (or 20 flights) of training on the sUAS and/or simulator before commencing commercial operations.

The applicant notes that the FAA has found that safety factors permitted operation of sUAS by pilots with these qualifications in the case of operations pursuant to public COAs where the mandatory operating conditions specified above are present. See Federal Aviation Administration, Notice N-8900.227, Unmanned Aircraft Systems (UAS) Operational Approval, at 20-21 (July 30, 2013). The FAA has the statutory authority, granted at 49 U.S.C.§44701(f) to waive the pilot requirements for commercial operations.

Given these conditions and restrictions, an equivalent level of safety will be provided by allowing operation of the sUAS without a private pilot's certificate or a commercial pilot's certificate, under the conditions set forth herein.

The risks associated with the operation of the sUAS (given its size, speed, operational capabilities, and lack of combustible fuel) are so diminished from the level of risk associated with private pilot operations or commercial operations contemplated by Part 61 with conventional aircraft (fixed wing or rotorcraft), that allowing operations of the sUAS 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).

14 CFR § 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 sUAS without an airworthiness certificate, no standard will exist for airworthiness of the sUAS. Given the size of the sUAS and the previous COAs issued for similar sUAS, an

equivalent level of safety will be achieved by ensuring compliance with the given sUAS OEM manuals and use of safety checklists prior to each flight.

14 CFR § 91.9(b)(2): Civil Aircraft Flight Manual in the Aircraft.

> The regulation provides:
>
> No person may operate a U.S.-registered civil aircraft ...
>
> (2) For which an Airplane or Rotorcraft Flight Manual is not 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.

Given the size of sUAS, they have no ability or place to carry such a flight manual on the aircraft, not only because there is no pilot on board, but because there is no room or capacity to carry such an item on the aircraft.

The equivalent level of safety will be achieved by keeping the flight manual at the ground control point where the pilot flying the sUAS will have immediate access to it. The FAA has issued to others the following exemptions to this regulation: Exemption Nos. 8607, 8737, 8738, 9299, 9299A, 9565, 9565B, 10167, 10167A, 10602, 32827, and 10700.

14 CFR § 91.103: Preflight action

This regulation requires each pilot in command to take certain actions before flight to insure the safety of flight. As FAA approved rotorcraft flight manuals will not be provided for the aircraft an exemption will be needed. An equivalent level of safety will be provided by following a comprehensive preflight checklist. The PIC will take all actions including reviewing weather, flight battery requirements, landing and takeoff distances and aircraft performance data before initiation of flight.

14 CFR § 91.109(a) & 91.319(a)(1): Flight Instruction

> These regulations provide that no 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.

The sUAS are remotely piloted aircraft and by design, do not have fully functional dual controls. Flight control is accomplished through the use of a control box that communicates with the aircraft via radio communications. The flight plan is either manually controlled through point- and-click navigation or preprogrammed as way points into the auto pilot before or during flight and only in unusual circumstances will the pilot input control functions to alter the pre-programmed flight. Given the size and speed of the sUAS, an equivalent level of safe training can still be performed without

dual controls because no pilot or passengers are aboard the sUAS, and all persons will be a safe distance away should the sUAS experience any difficulties during flight instruction. The FAA has approved exemptions for flight training without fully functional dual controls for a number of aircraft and for flight instruction in experimental aircraft. See Exemption Nos. 5778K & 9862A.

14 CFR § 91.119: 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.

Because aerial survey, mapping and inspection 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 sUAS are built. Also, no flight will be taken without the permission of the land owner or those who control the land. Because of the advance notice to the landowner, all affected individuals will be aware of the flights. Compared to aerial survey operations conducted with aircraft or rotorcraft weighing far more than the weight of the systems requested for exemption, and carrying flammable fuel, any risk associated with these operations will be far less than those currently allowed with conventional aircraft operating at or below 500 feet AGL. Indeed, the low-altitude operations of the sUAS will maintain separation between these sUAS operations and the operations of conventional aircraft that must comply with Section 91.119.

14 CFR § 91.121: Altimeter Settings

> Section 91.121 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.

Some sUAS have a barometric pressure sensor, while others only use GPS for elevation or altitude. When a barometric pressure sensor is on the sUAS, it is typically “zeroed” at the point of take-off; this is right next to the PIC and not at a departure airport. The altitude reading will be relative to that point and not a known elevation.

The equivalent level of safety will be achieved by the PIC confirming the elevation or altitude of the launch site. The altitude of the sUAS will also be displayed via telemetry on the Ground Station and will be constantly monitored by the PIC during the entire flight operation.

14 CFR § 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 different sUAS batteries provide a variety of powered flight times. An exemption from § 14 CFR 91.151 is therefore required.

The applicant believes that an exemption from 14 CFR § 91.151(a) is safe and within the scope of a prior exemption. See Exemption 10673 (allowing Lockheed Martin Corporation to operate without compliance with 91.151(a)). Operating the sUAS, without 30 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 sUAS operates. The fact that it carries no pilot, passenger, or cargo also enhances its safety. In the unlikely event that the sUAS should run out of fuel, it would simply land. Given its weight and construction material, the risks are less than contemplated by the current regulation.

The applicant believes that an equivalent level of safety can be achieved by maintaining 10% of reserve fuel (or battery), which would be more than adequate to return the sUAS to its planned landing zone from anywhere in its operating area.

The FAA has granted similar exemptions to others, including Exemptions 2689F, 5745, 10673 and 10808.

14 CFR § 91.203 (a) & (b): Carrying Civil Aircraft Certification and Registration

> This regulation provides as follows:
>
> (a) ...no person may operate a civil aircraft unless it has ... 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.

The sUAS fully loaded weigh less than 55 lbs. As such, there is no ability or place to carry certification and registration documents or to display them on the sUAS. In addition, there is no pilot on board the aircraft.

An equivalent level of safety will be achieved by keeping these documents at the ground control point where the pilot flying the sUAS will have immediate access to them. The FAA has issued numerous exemptions to this regulation. A representative sample of

other exceptions includes Exemption Nos. 9565, 9665, 9789, 9789A, 9797, 9797A, 9816A, and 10700.

14 CFR § 91.405(a); 407(a)(1); 409(a)(2); 417(a): Maintenance Inspections

> Section 91.405(a) requires that an aircraft pilot 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 air worthiness certificate. Section 91.417(a) requires the owner or pilot 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.

The sUAS under request are nearly maintenance free, they perform automatic pre-flight checks and the failure of any check will prevent take-off. Checks which cannot be done by the system will be performed by a qualified person prior to each flight and at predefined intervals as part of a maintenance schedule.

Pre-flight checklist includes:

1. Visual inspection of the airframe
2. Visual inspections of rotor integrity
3. Check charge of all batteries (aerial vehicle, command station, radio repeater station)

An equivalent level of safety will be achieved because the sUAS is small in size, will carry no external payload, will operate only in restricted predetermined areas and is not a complex mechanical devise. The pilot of a sUAS will ensure that it is in working order prior to initiating flight, perform required maintenance, and keep a log of any maintenance that is performed. Moreover, the pilot 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.

If mechanical issues arise, the UAS can land immediately due to the pre-determined area of operation. Moreover, the UAS's small size, carrying capacity, and the fact that flight operations will only take place in restricted areas for limited periods of time, create less risk than the same factors associated with conventional fixed-wing aircraft and rotorcraft performing the same operation.

SUMMARY OF SECTION 333 EXEMPTION REQUEST

As an aviation centric company with 10 years' experience, it is enrGies Inc.'s belief that the size, weight, speed, operating environment, system capabilities and extensive PIC training and experience provide greater than the equivalent level of safety when operating a sUAS and that it is in the public interest as outlined in Section 333 of the FMRA. It is requested that the FAA issue an exemption to permit safe, legal, commercial sUAS operation by enrGies Inc. as soon as possible.

enrGies, hereby provides pursuant to Part 11, a summary of its exemption application to allow commercial operation of sUAS for aerial acquisition and research in support of government entities, agriculture industry, utility companies, local infrastructure, scientific studies, wildlife monitoring, oil and gas industries, mining, surveying, forestry, and much more. All of which are critical to the well-being of the general public. An exemption is therefore requested from the following regulations:

14 C.F.R. Part 21;

14 C.F.R. 45.23(b);

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. 91.9(b)(2) & (c);

14 C.F.R. 91.103;

14 C.F.R. 91.109(a);

14 C.F.R. 91.119;

14 C.F.R. 91.121;

14 C.F.R. 91.151(a);

14 C.F.R. 91.203(a) & (b);

14 C.F.R. 91.405(a);

14 C.F.R. 91.407(a)(1);

14 C.F.R. 91.409(a)(2);

14 C.F.R. 91.417(a).

enrGies
from concept to completion

2 December 2014

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

RE: Exemption request under Section 333 of the FAA Modernization and Reform Act of 2012 and 14 C.F.R. Part 11

Dear Sir or Madam:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (FMRA) and 14 C.F.R. Part 11, enrGies, Inc. requests exemptions from several provisions of the Federal Aviation Regulations (FAR), specifically portions of 14 C.F.R Parts 45, 61, and 91 to allow among other things, commercial operations of its Lockheed Martin Procerus Technologies, Vertical Takeoff and Landing (VTOL) Indago unmanned aircraft system in the Continental United States (CONUS) by individuals who have successfully completed at a minimum, FAA private pilot ground instruction and passed the FAA private pilot written examination or FAA recognized equivalents and completed enrGies US Military-approved training program for operation of unmanned aircraft.

enrGies originated as an aviation engineering company supporting the U.S. Army. They have incorporated the aviation mentality and discipline into every aspect of day-to-day business operations. Standardization of processes is common throughout all business units. The aviation mentality is the cornerstone of our business. We have continued to use these same mandates to conduct all sUAS operations.

The Indago is an electric powered rotorcraft, small Unmanned Aircraft System (sUAS) that depending on its payload is capable of transmitting live airborne video images and location information to a Ground Control Station (GCS) or conducting high resolution photogrammetry or hyper-spectral data collection. If used for high-resolution photographs and hyper-spectral data, the Indago stores the photographs and data on board and makes them available for download after completion of the flight. The Indago is 32 in x 32 in x 9 in and weighs 4.9 pounds, well under the 55 lbs mandated in the FMRA. The Indago can conduct hovering flight and has a maximum cruising speed of 26 knots. It is battery powered, has a flight endurance of 45 minutes and can operate in temperatures ranging from -30° to 120° F. The Indago's omni-directional antenna has a range of 1.2 miles and the directional antenna has a range of 3.1 miles

The Indago has an unparalleled safety record and is in use by various government agencies. When this safety record is taken into account with the areas in which enrGies will operate, it becomes clear that the Indago can operate safely in the National Airspace System (NAS), without posing a threat to national security, by operating in accordance with the requirements discussed herein.

The Indago's capabilities, along with enrGies experience conducting UAS training, maintenance, and operations for the Department of Defense and other U.S. Government customers, make it ideally suited to conduct commercial operations such as agriculture, aerial surveying, and patrolling in remote areas (i.e. non-congested or non-populated areas, private or controlled-access property) under Class E or Class G airspace and within Visual Line of Sight (VLOS). Use of the Indago reduces the need to operate manned aircraft, decreasing the risk to the pilot, crew, and those on the ground as the Indago is carried to the area of operations and not flown there.

As a result of the Indago's size, weight, maximum speed, operational capability, and safety record; the distance at which it will operate from airports; and its operation using visual observers to provide de-confliction from other air traffic, the Indago does not create a hazard to users of the NAS or the public. Neither does it pose a threat to national security. The petitioner states that, given the clear direction in Section 333, the strong equivalent level of safety surrounding the proposed operations, and the significant public benefit, including enhanced safety, reduction in environmental impacts, including reduced emissions associated with allowing UAS. Therefore, the FAA should grant enrGies' the requested exemptions. Alternatively, if the FAA finds that modification of enrGies' application is required for safe operation of the Indago in the NAS, enrGies' requests that the FAA delineate the required modifications and either process enrGies' application as if the modifications were already made or allow enrGies' to amend its application to incorporate the FAA's findings.

The name and address of the applicant are:

enrGies, Inc.
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Regulations from which the exemption is requested:

14 C.F.R Part 21
14 C.F.R. 45.23 (b)
14 C.F.R. 61.113 (a) & (b)
14 C.F.R. 91.7 (a)
14 C.F.R. 91.9 (b) (2)
14 C.F.R. 91.103
14 C.F.R. 91.109
14 C.F.R. 91.119
14 C.F.R. 91.121
14 C.F.R. 91.151 (a)
14 C.F.R. 91.203 (a) & (b)
14 C.F.R. 91.405 (a)
14 C.F.R. 407 (a) (1)
14 C.F.R. 409 (a) (2)
14 C.F.R. 417 (a) & (b)

This exemption application is expressly submitted to fulfill Congress goal in passing Section 333 (a) through (c) of the Reform Act. This law directs the Secretary of Transportation to consider whether certain unmanned aircraft systems 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 UAS 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 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). Lastly, if the Secretary determines that such vehicles "may operate 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)[1]

The FRMA 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, that includes sUAS, from the requirement that all civil aircraft must have a current airworthiness certificate.

The Administrator may grant an exemption from a requirement of a regulation prescribed under subsection (a) or (b) of this section or any sections 44702-44716 of this title if the Administrator finds the exemption in the public interest. 49 U.S.C. §44701(f) See also 49U.S.C. §44711(a); 49 U.S.C. 44704; 14 C.F.R. §91.203 (a) (1).

[1] Applicant interprets this provision to place the duty on the Administrator to not only process applications for exemptions under section 333, but for the Administrator to craft conditions for the operation of the UAS, if it should be determined that the conditions set fourth herein do not fulfill the statutory requirements for approval.

enrGies sUAS are rotorcraft, weighing 55 lbs. or less, including payload. They operate under normal conditions at a speed of no more than 50 knots and have the capability to hover and, move in the vertical and horizontal plane simultaneously. They will operate within line of sight and will only operate in non-populous areas under strict risk mitigation guidelines as outlined in the enrGies Flight Operations and Ground Operations Procedures (hereinafter "the Manual")[2]. Such operations will insure that the sUAS will "not create a hazard to users of the national airspace system or the public"[3]

Given the small size of the sUAS involved and the restricted sterile environment within which they will operate, the applicant falls squarely within the zone of safety (an equivalent level of safety) in which Congress envisioned that the FAA must, by exemption, allow commercial operations of UAS to commence immediately. Also, due to the size of the UAS and the areas in which the relevant sUAS will operate, approval of the application presents no national security issue. Given the clear direction in Section 333 of the Reform Act, the authority contained 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, reduction in environmental impacts, including reduced emissions associated with allowing UAS for commercial operations, the grant requested exemptions is in the public interest. Accordingly, the applicant respectfully requests that FAA grant the requested exemption without delay.

Airworthiness

The Indago is safe and fit for operation in the NAS under the conditions listed herein. Additionally the Indago is in use by several U. S. Government agencies. In support of this application, upon request enrGies can provide the following documents, the Indago Flight and Maintenance Manual and the enrGies Commercial sUAS Flight Operations Procedures.

[2] The U.S. Army Government Flight Representatives have reviewed this manual and has found it to be acceptable for conducting sUAS operations for the military in compliance with AR 95-20. Applicant may provide this manual as a Confidential document under 14 C.F.R. 11.35 (b) as the entire manual contains proprietary information that the applicant has not and will not share with others. The manual contains operating conditions and procedures that are not available to the public and are protected from release under the Freedom of Information Act 5 USC 552 et.seq.

[3] Reform Act Section 333 (b)

Mandatory Operating Conditions

enrGies proposes that the grant of the exemption be subject to the following mandatory conditions which are based upon operating conditions set forth for operation of UAS for commercial use pursuant to Certificates of Waiver or Authorization, with additional restrictions.

- All operations to occur in Class G or Class E airspace.
- Aircraft will not exceed 41 knots.
- Avoid congested or populated areas, which are depicted in yellow on VFR charts.
- Operations to be conducted on private or controlled-access property.
- Permission from landowner / controller required before commencing any flight.
- Aircraft to remain within Visual Line of Sight (VLOS).
- Operations to occur during daylight hours.
- Above Ground Level (AGL) altitude to be restricted to 400 feet.
- All operations conducted in vicinity of airport to remain more than 2.5 NM from centerline azimuth of runway centerline measured from runway thresholds or a letter of agreement with the airfield manager will be on file for operations closer then 2.5 NM
- Pilot in Command will file a NOTAM for each flight.
- All required authorizations and permits will be obtained from territorial, state, county, or city jurisdictions, including local law enforcement, fire, or other governmental agencies.

Operator Requirements

enrGies respectfully proposes that operator requirements should take into account the characteristics of the particular UAS. The Indago is an inherently stable, lightweight aircraft that weighs 4.9 lbs. and will be operated in remote areas. The safety concerns addressed by requiring a pilot certificate are not present; moreover, although the aircraft can be configured to the give the pilot full control of the aircraft and payload during flight, the Indago has an advanced autopilot that flies the aircraft, managing altitude and flight path within the intended flight envelope at all times when the that flight mode is engaged. The autopilot limits maneuvering to simple airspeed, altitude, and turn rate changes. These limits are hard coded into the autopilot and define the aircraft's normal flight operating envelope. The autopilot manages, pitch, roll, yaw and collective throttle to maintain target airspeed, target turn rate, and target altitude. All flight modes utilize GPS and in the event of unintended input the aircraft can be put into an operator controlled flight mode that allows for the aircraft to come to an immediate hover. Turn rates and airspeeds are limited by the autopilot and do not allow commands that are outside of the normal operating envelope.

Equally significant, the Indago is comprised of composite materials, has energy absorbing landing gear that reduce damage in the event of a hard landing and is composed of carbon fiber and Kevlar components.

The Indago has three emergency failsafe procedures:

Loss of Communication: In the event the communication link with the operators ground control station is lost, the Indago enters a hover mode for 10 seconds. It then returns home at the current altitude, arrives at the home waypoint and hovers for an additional 10 seconds. If link is not reestablished, the aircraft conducts a controlled landing then shuts off the motors.

Low Battery: The ground control station will alert the operator of a low battery onboard the aircraft. Upon reaching 14.7 volts the aircraft will fly to a user defined waypoint, upon reaching 14.2 volts the aircraft will land immediately at its current location.

Loss of GPS: A loss of GPS while in guidance mode will cause the aircraft to hover using onboard pitch, roll, and yaw gyro's. After 10 seconds the aircraft will land immediately at its current location.

Given these safety features, enrGies proposes that operators of the Indago should not be required to possess a commercial or private pilot certification. Instead, operators should be required to meet the following criteria:

- U.S. Citizens
- Successful completion, at a minimum, of FAA private pilot ground instruction and a passing score on the FAA private pilot written examination or FAA - recognized equivalents.
- Completion of the enrGies UAS training program for operation of the UAS.

Specific Exemption Requests and Equivalent Level of Safety Showings

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

The regulation requires:

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

Even though the UAS will have no airworthiness certificate, an exemption may be needed as the UAS will have no entrance to the cabin, cockpit or pilot station on which the word "Restricted" can be place as required by this provision. Two-inch lettering also is not possible given the overall size of the Indago. enrGies, therefore, requests an exemption to display, with one-inch lettering the word "Restricted" on the fuselage in compliance with §45.299(f).

The equivalent level of safety will be achieved by having the Indago marked with one inch lettering on its fuselage because the pilot, observer, and others working with the sUAS will have the identification of the aircraft as "Restricted". The FAA has issued

similar exemptions to this regulation, including to Pioneer Hi-Bred International, Inc., Exemption No. 10810; Raytheon Missile Systems/Advanced Programs, Exemption Nos. 10167 and 8738; and Trimble Navigation Limited, Exemptions No. 10700 and 11042.

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

Subsections (a) and (b) of §61.113 prohibit private pilots from operating aircraft in commercial operations, and section 61.133 (a) requires an individual operating an aircraft for compensation or hire to hold a commercial pilot certificate. As mentioned above, the FAA has the statutory authority to waive the pilot requirements for commercial operations. 49 U.S.C. § 44701(f)

enrGies requests exemption from 14 C.F.R. §§61.133(a) so that the Indago may be operated by individuals who have (a) completed FAA private ground instruction and passed the FAA private pilot written examination or FAA-recognized equivalent, and (b) completed enrGies training program for operation of the Indago

Based upon the design features of the Indago, its autopilot system and safety factors the FAA should permit operation of UAS by operators without pilot certificate when the following conditions have been satisfied:

- The PIC successfully completed, at a minimum, FAA private pilot ground instruction and passed the FAA private pilot written examination or FAA-recognized equivalents. (Airmen Test Reports are valid for the 24-month period preceding the month the exam was completed, at which time the instruction and written examination must be repeated.)
- Operations occur during daylight hours.
- The operation is conducted in a sparsely populated location.
- Operations are approved and conducted solely within visual line-of-sight in Class E or G airspace.
- Visual line-of sight-operations are at an altitude of no more than 400 feet AGL at all times.
- Operations are conducted no closer than 2.5NM from any FAA-designated airport or heliport other than the airport from which the aircraft is operating.
- The operation is conducted from a privately owned airfield.

Federal Aviation Administration, Order 8900.1 16-4-1-3 (B)(5) (June 23, 2014); see also Federal Aviation Administration, Notice N-8900.227, Unmanned Aircraft Systems (UAS) Operational Approval, at 20-21 (July 30,2013).

enrGies proposes to conduct operations in accordance with these restrictions. Given these conditions and restrictions, an equivalent level of safety will be provided by allowing operation of the Indago without a private pilot's certificate or a commercial pilot's certificate. The risks associated with the operation of the Indago (given its size, speed, operational capabilities, and lack of combustible fuel) are so much less than the level of risk associated with fixed wing and rotorcraft operations, both private and commercial as contemplated by Part 61, that allowing operations of the Indago, as set forth above, meets or exceeds the present level of safety provided under 14 C.F.R. §§ 61.113 (a) & (b) and 61.133(a)

14 C.F.R. § 91.7 (a) and (b): Civil aircraft airworthiness

Sections 91.7 (a) and (b) prohibit operation of a civil aircraft unless it is in airworthy condition. enrGies request an exemption from this regulation because the Indago would not operate with an airworthiness certificate under the proposal set forth in this filing. Given the size of the aircraft and requirements contained in the Manual for maintenance and use of safety check lists prior to each flight, as set forth in Sections J, L and Q, and equivalent level of safety will be provided.

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

Section 91.109 (a) provides that no 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.

The Indago is a remotely piloted aircraft, and, by design, it does not have fully functional dual controls. Flight control is accomplished through the use of a control box that communicates with the aircraft via radio communications. Completing instruction through enrGies training program will ensure and equivalent level of safety.

The FAA has approved exemptions for flight training without fully functional dual controls for a number of aircraft and for flight instruction in experimental aircraft. *See Exemption Nos. 5778K and 9862A.*

14 C.F.R § 91.119 Minimum Safe Altitudes

Section 91.119 establishes safe altitudes for operation of civil aircraft. Specifically, Section 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 Indago will never operate at higher than 400 feet AGL. Because agriculture, aerial survey work, and patrolling must be accomplished at relatively low altitudes, i.e. 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 Indago is built. Also, no flight will be taken without the permission of the land owner or the party controlling the land. With advance notice to the landowner, all affected individuals will be aware of agriculture, survey, and patrolling flights. Compared to similar operations conducted with conventional aircraft or rotorcraft, which weigh thousands of pounds and carry flammable fuel, any risk associated with these operations will be far less than those currently allowed with such conventional aircraft operating at or below 500 feet AGL.

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

Section 91.151 (b) prohibits an individual from beginning "a flight in a rotorcraft 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, to fly after that for at least 20 minutes.

The Indago's battery provides 45 minutes of powered flight. Without an exemption

from 14 C.F.R. §91.151, the Indago's flights would be approximately 25 minutes in length. Given the limitations on its proposed operations and the location of those proposed operations, a longer time frame for flight in VFR conditions is reasonable.

enrGies believes that an exemption from 14 C.F.R. § 91.151 (a) is safe and consistent with the scope of a prior exemption. *See* Exemption 10673 (allowing Lockheed Martin Corporation to operate without compliance with 91.151 (a)). Operating the Indago a small UAS without 20 minutes of reserve fuel does not engender the type of risks that Section 91.151 (a) was meant to prevent. The fact that the Indago carries neither pilot, passenger, nor cargo also enhances its safety. Additionally, limiting Indago flights to 25 minutes would greatly reduce its utility. In the unlikely event that the Indago should run out of fuel, it would simply come to a hover and land. Given its weight and construction material, the risks are less then contemplated by the current regulation.

enrGies believes that an equivalent level of safety can be achieved by maintaining 5 minutes of reserve fuel, which, allowing 40 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 others, including Exemptions 2689F, 5745, 10673, and 10808.

14 C.F.R § 91.405 (a); 91.407 (a) (1); 91.409 (a) (2); 91.417 (a): Maintenance inspections

Section 91.405 (a) requires that an aircraft operator or owner "[s]hall have that aircraft inspect as prescribed in subpart E of this part and shall between required inspections, excepts 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 issuance of an air worthiness certificate. Section 91.417 (a) requires that an owner or operator 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 Indago will be accomplished by enrGies UAS technicians pursuant to the manuals provided by Lockheed Martin Procerus Technologies. An equivalent level of safety will be achieved because the Indago is small in size, will operate only in predetermined areas, and is not a complex mechanical device. With the combined use of the LMPT Indago operator's and maintenance manual and enrGies Commercial sUAS Flight Operations Procedures, the Pilot in Command of the Indago will ensure that it is in safe working order prior to initiating flight, enrGies maintenance technicians will perform required maintenance, and keep a log of any maintenance that is performed. Moreover, the Pilot in Command, prior to all flight will ensure the aircraft is safe for flight which will provide an equivalent level of safety.

Federal Register Summary

Pursuant to 14 C.F.R. § 11.81(f), the following summary is provided for publication in the Federal Register, should the FAA determine that publication is needed:

Docket No.: No. FAA-2014-
Petitioner: enrGies, Inc.

Section of 14 CFR: 14 C.F.R. § 45.23(b), 14 C.F.R. § 61.113(a) and (b), 14 C.F.R. § 61.133(a), 14 C.F.R. § 91.7(a) and (b), 14 C.F.R. § 91.109(a), 14 C.F.R. § 91.119, 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).

Description of Relief Sought: enrGies is seeking an exemption to conduct commercial agriculture, aerial survey, and patrol operations using a small unmanned aircraft system (55lbs or less) in areas of the continental United States.

Based upon the foregoing, enrGies requests that the FAA grant it the necessary exemptions under Section 333 of the FAA Reform ACT and 49 U.S.C. §44701(f) of the Federal Aviation Act as requested herein to allow commercial operations of the Indago within the continental United States and its territories.

Sincerely,

Jay Lovelady