

November 12, 2014

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U.S. Department of Transportation
Docket Operations, M-30
1200 New Jersey Avenue, SE
Room W12-140, West Building Ground Floor
Washington, DC 20590-0001

Re: *Petition of Notus Access Group for an Exemption Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 to Operate an Unmanned Aircraft System*

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, Notus Access Group (NAG) hereby applies for an exemption from the Federal Aviation Regulations identified below to allow for the commercial operation of the InstantEye Mk-2 small unmanned aircraft system manufactured by Physical Sciences Inc.

I. REGULATIONS FOR WHICH EXEMPTION IS REQUESTED

NAG requests exemption from the following regulations:

- 14 C.F.R Part 21, Subpart H;
- 14 C.F.R Part 27;
- 14 C.F.R § 45.23(b);
- 14 C.F.R. § 45.27(a);
- 14 C.F.R § 61.113;
- 14 C.F.R § 91.7(a);
- 14 C.F.R § 91.9(b)(2);
- 14 C.F.R § 91.9(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) & (b)

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- 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) & (b).

This petition incorporates the material contained in the NAG Operations, Inspection, and Maintenance Manual, the NAG Flight Operations Areas Manual, the InstantEye Mk-2 Training Manual, and the InstantEye Mk-2 Operator Training Guide (together, the NAG Manuals). The NAG Manuals are submitted as confidential under 14 C.F.R. § 11.35(b), as they contain commercial and proprietary information that NAG has not and will not share with others, is not available to the public, and is protected from release under the Freedom of Information Act, 5 U.S.C. § 552 *et seq.*

II. STATUTORY AUTHORITY FOR REQUESTED EXEMPTIONS

This petition for exemption is submitted in accordance with Section 333 of the Reform Act. Congress has directed the FAA “to safely accelerate the integration of civil unmanned aircraft systems into the national airspace system.” Pursuant to Section 333 of the Reform Act, the FAA Administrator is to permit operation of an unmanned aircraft system where it does not create a hazard to users of the national airspace system (NAS) or the public or pose a threat to national security based on the following considerations:

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

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

III. DESCRIPTION OF NOTUS ACCESS GROUP AND ITS SERVICES

Notus Access Group (“NAG”) is a privately held company with its headquarters in Newport, Washington. NAG performs inspections, maintenance, and repairs on wind turbine blades and towers for the renewable energy industry. These services are performed in a manner to

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minimize downtime of the wind turbine generator. The NAG team brings over 17 years of combined experience in the renewable energy industry.

NAG services are traditionally performed using rope access and aerial inspection methods. A picture demonstrating traditional rope access for wind turbines is shown below in Figure A.

Figure A: Traditional Rope Access for Wind Turbines



The contact information for the petitioner, NAG, is as follows:

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IV. DESCRIPTION OF PROPOSED OPERATIONS

NAG is requesting exemptions from applicable Federal Aviation Regulations (FARs) pursuant to Section 333 of the Reform Act to perform aerial inspections of wind turbine blades and towers used in the renewable energy industry.

A. The InstantEye Mk-2

NAG will operate the InstantEye Mk-2 manufactured by Physical Sciences Inc. The InstantEye Mk-2 is a battery-operated quadcopter that can be hand launched and recovered by a single person with a maximum flying time of 20 to 30 minutes. The vehicle weighs approximately one pound with a camera payload and is about 10 inches wide. The aircraft groundspeed will be less than 25 mph, and it will operate at or below 500 feet AGL. The InstantEye Mk-2 manufacturer's specifications are shown below in Figure B:

Figure B: InstantEye Mk-2 Manufacturer's Specifications

InstantEye Mk2Gen3 Vehicle

Weight: 320 (dry)
Size: 25cm width (10in)
Video: 3 real-time cameras (standard)
Latency: < 0.01s
Control: Autonomous / Supervisory / Manual
Range: 600-1400 m
Speed: 35 mph autonomous. 55 mph manual
Endurance : >30 minutes (payload dependent)
Ceiling: <12,000 ft MSL
Max Wind: >30 (steady)
Max Payload: 450 grams(2Ah), 300 grams (4Ah)
Lost Link: Automatic return to GCS
Operating Conditions: All Weather, 0F – 120F
Battery: 2Ah/4Ah 11.1V LiPo.
Battery Recharge Time: 60minutes (4Ah)
Battery Swap Time: <60 seconds
Motor/Prop Replace Time: <2minutes
Air Worthiness Release Certified: Yes
Federal Aviation Administration Certification: Experimental (certification required for individual vehicles)

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The InstantEye Mk-2 is shown below in Figure C.

Figure C: InstantEye Mk-2



B. Prior Operational Approval of the InstantEye Mk-2

The InstantEye Mk-2 received an Airworthiness Release from the U.S. Army Special Operations Command for approved operations in the NAS and in combat operations. (See AWR# IEMK220130521, Attachment 1.)

The InstantEye Mk-2 received an exemption for operation in the NAS with conditions and limitations stipulated in Special Airworthiness Certificate in the Experimental Category and the Certificate of Waiver or Authorization (COA) issued to the San Diego Gas & Electric Company. (Exemption No. 10968, Regulatory Docket No. FAA-2013-1127, Attachment 2)

Based on the operational approvals mentioned above, the InstantEye Mk-2 has developed a substantial safe operational history.

C. NAG's Proposed Operations Demonstrate an Equivalent Level of Safety

1. General Description of Proposed Flight Operations

NAG proposes to operate within the limitations and performance specifications listed in the NAG Manuals, which are summarized below. These limitations provide for at least an equivalent, or higher, level of safety for operations under the current regulatory structure because the proposed operations represent a safety enhancement to the already safe protocols currently used for the inspection of wind turbine blades and towers.

The proposed operations do not create any hazard to users of the national airspace system or pose a threat to national security. The aircraft is an electric quad-rotor aircraft weighing approximately one pound including payload. It operates at a speed of no more than 25 mph, will only be operated in the visual line of sight (VLOS) of the pilot in command, and will remain at or below 500 feet AGL. The requirement for clearance up to 500 feet AGL is

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necessitated by the size of the wind turbines, which can vary greatly in size and may reach as high as 150 meters, or 492.126 feet AGL, when the blades are positioned vertically. Figure D, below, shows the varying sizes of exemplar wind turbines.

Figure D: Wind Turbine Size



Manned aircraft are at risk of fuel spillage and fire in the event of an incident or accident. The InstantEye Mk-2 carries no fuel, and therefore the risk of fire following an incident or accident due to fuel spillage is eliminated. Compared to manned aircraft, the unmanned aircraft being operated by the petitioner reduces the risk to participating persons in close proximity to the aircraft due to the limited size, weight, operating conditions, and design safety features of the InstantEye Mk-2.

NAG’s inspection operations will be in remote areas at least 5 miles from any airport and away from population centers. The InstantEye Mk-2 will be operated on wind farms, which are remote from population centers and airports, with permission from the owners of the facilities being inspected. Moreover, wind turbine towers and wind farms are already subject to obstruction marking, lighting and notification requirements set forth by the FAA.

The FAA has determined that the risk of not having an electronic means to monitor and communicate with other aircraft, such as transponders or sense and avoid technology, is mitigated by placing limits on altitude, requiring stand-off distance from clouds, permitting daytime operations only, and requiring that the aircraft be operated within visual line of sight and yield right of way to all other manned operations. Additionally, the operator will request

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a NOTAM prior to operations to alert other users of the NAS. See Exemption No. 11062, Docket No. FAA 2014-0352, at p. 13.

The petitioner's aircraft has the capability to operate safely after experiencing certain in-flight failures. The aircraft is also able to respond to a lost-link event with a pre-coordinated, predictable, automated flight maneuver.

2. Specific Limitations on Proposed Flight Operations

Given the small size involved, the restricted environment within which they will operate, the procedures listed below, and pilot certification requirements, NAG's proposed operations using the InstantEye Mk-2 would "not create a hazard to users of the national airspace system or the public or pose a threat to national security." Reform Act Section 333(b)(1).

1. The aircraft is approximately one pound with the camera payload.
2. The aircraft will be identified by serial number, registered with the FAA, and have identification (N-Number) markings as large as practicable.
3. Flights will be operated within visual line of sight of the pilot in command (PIC).
4. Prior to each flight, a zero altitude initiation point will be established and confirmed for accuracy by PIC.
5. Maximum flight time for each operational flight will be 30 minutes.
6. The aircraft will be safely landed with no less than the greater of (a) 20% battery life remaining or (b) five minutes of flight time remaining.
7. The aircraft will be operated during daylight and in VFR conditions.
8. Flights will not exceed 500 feet AGL, so as to accommodate inspections of wind turbines.
9. Flights will be operated at a lateral distance of at least 50 feet from any persons or property not associated with the operation who have not given prior permission.
10. Flights will be limited to a groundspeed of 25 mph and vertical ascent will be limited to 20 mph.
11. Minimum crew for each flight will consist of a PIC and an Observer.

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12. The PIC will possess at least a private pilot certificate, a third class medical certificate, and will have completed NAG's Basic Operator Course for the InstantEye Mk-2, which is equivalent to the two-day course offered by the manufacturer, Physical Sciences Inc.
13. Prior to the flight, a Mission Plan will be created setting forth the limitations for the flight as well as contact information for the PIC.
14. The flight operations will yield the right of way to other manned aircraft operations.
15. All persons who are not involved with NAG's operations will be required to be at least 500 feet from flight operations.
16. The aircraft will only operate within the wind farms depicted in the operating area as shown by the maps included in Attachment 3.
17. NAG will provide NOTAM details to the FAA 24 hours prior to each flight.
18. All required permissions and permits will be obtained from territory, state, county or city jurisdictions prior to flight.
19. Prior to commencing operations, NAG will obtain a Certificate of Waiver or Authorization (COA) from the FAA.
20. Written or oral permission from the relevant property owners will be obtained prior to flight.
21. If the aircraft loses communications, it will have the capability to return to a pre-determined location within the operational area and land.
22. If the aircraft loses its GPS signal it will have the capability of being flown manually to a predetermined location within the operational area and land.
23. The flight will be aborted in case of unpredicted obstacles or emergencies.
24. Each flight will be recorded in an Operations Log Book.
25. Maintenance on the aircraft will be recorded in a Maintenance Log Book.

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3. Flight Recovery, Lost Communications, and Lost GPS Procedures

The flight recovery, lost communications, and lost GPS procedures are fully documented in the attached InstantEye Training Manual. (Attachment 4) The lost communications functionality has been extensively tested and is used operationally. (See AWR# IEMK220130521, Attachment 1.)

4. Proposed Flight Areas in Designated Wind Farms

NAG is requesting to operate in designated wind farms identified in the NAG Flight Operations Areas Manual. (*See Operating Areas, Attachment 3.*)

V. SPECIFIC FAR EXEMPTIONS REQUESTED

NAG seeks an exemption from several interrelated provisions of 14 C.F.R. Parts 21, 45, 61, and 91 for purposes of conducting the requested operations using the InstantEye Mk-2. Listed below are (1) the specific FAR sections for which exemption is sought, and (2) the operating procedures and safeguards that NAG has established which will ensure a level of safety better than or equal to the rules from which exemption is sought. *See* 14 C.F.R. § 11.81 (e).

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

The FAA has stated that no exemption is needed from this section if a finding is made under the Reform Act that the UAS selected provides an equivalent level of safety when compared to aircraft normally used for the same application. These criteria are met, and therefore no exemption is needed. *See* Grant of Exemption to Astraeus Aerial, Docket No. FAA 2014-0352 at 13-14, 22. If, however, the FAA determines that there are some characteristics of the InstantEye Mk-2 that fail to meet the requirements of the Reform Act, an exemption is requested.

Equivalent Level of Safety: The InstantEye Mk-2 is safe when taking into account its size, weight, speed, operational capability and prior approvals by the FAA and the U.S. Army Special Operations Command. The InstantEye Mk-2 weighs approximately one pound and will be flown at speeds less than 25 miles per hour, in visual line of sight of the operator, and in remote and unpopulated airspace. The InstantEye Mk-2 does not carry pilots, passengers, explosive materials, or flammable liquid fuels. The InstantEye Mk-2 will be operated within the parameters of the NAG Manuals.

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NAG will also provide the FAA with advance notice of all operations via NOTAM and coordination with the local FSDO. The proposed operations will be at least as safe as, or safer than, conventional rotorcraft operating with an airworthiness certificate without the restrictions and conditions proposed here. The proposed operations will also be as safe, or safer than, traditional wind turbine inspection methods using rope access.

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

14 C.F.R. Part 27 sets forth the procedural requirements for airworthiness certification of normal category rotorcraft. To the extent the InstantEye Mk-2 would otherwise require certification under Part 27, NAG seeks an exemption from Part 27's airworthiness standards for the same reasons identified in the request for exemption from 14 C.F.R. Part 21, Subpart H.

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

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

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

14 C.F.R. § 45.27(a) states:

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

14 C.F.R. § 91.9(c) states:

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

In a previous Grant of Exemption, the FAA determined that exemption from these requirements was warranted provided that the aircraft "have identification (N-Number) markings in accordance with 14 CFR part 45, Subpart C if the markings are "as large as practicable." See Exemption No. 11062, Docket No. FAA 2014-0352, at p. 14.

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Equivalent Level of Safety: NAG will mark all InstantEye Mk-2s with their N-Number in a prominent spot on the fuselage with markings that are as large as practicable.

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

NAG seeks exemption from 14 CFR § 61.113, which restricts private pilots from flying aircraft for compensation or hire and would also require a second class medical certificate. The purpose of Part 61 is to ensure that the skill and competency of any PIC matches the airspace in which the PIC will be operating, as well as requiring certifications if the pilot is carrying passengers or cargo for hire.

While the InstantEye Mk-2 will be operated as part of a commercial operation, it carries neither passengers nor cargo. In the Grant of Exemption in FAA Docket No. FAA-2014-0352, the FAA determined that the unique characteristics of UAS operation outside of controlled airspace did not warrant the additional cost and restrictions attendant with requiring the PIC to have a commercial pilot certificate and a class II medical certificate. The FAA has also determined that the required knowledge for a commercial pilot covers the same fundamental principles as a private pilot.

The PIC will possess at least a private pilot certificate, a third class medical certificate, and will have completed NAG's Basic Operator Course for the InstantEye Mk-2, which is equivalent to the course offered by the manufacturer, Physical Sciences Inc. This is a 2-day program that includes ground school and flight training. This course has been approved by the U.S. Army Special Operations Aviation Command. See InstantEye Training Manual and InstantEye Mk-2 Operator Training Guide for more information on this course. (Attachments 5 and 6)

The FAA stated in its grant of an exception to Astraeus Aerial the "the FAA considers the overriding safety factor for the limited operations proposed by the petitioner to be the airmanship skills acquired through UAS-specific flight cycles, flight time, and specific make and model experience, culminating in verification through testing." See Exemption No. 11062, Docket No. FAA 2014-0352, at p. 18. The proposed operations can achieve an equivalent level of safety by requiring the knowledge and experience in InstantEye Mk-2 operations described above.

Furthermore, the security screening conducted by the Transportation Security Administration of certificated airmen satisfies the statutory requirement of Section 333 for operations to not pose a threat to national security.

The restrictions NAG has placed on its InstantEye Mk-2 operations meet or exceed the restrictions similarly imposed on Astraeus Aerial in FAA Docket No. FAA-2014-0352. NAG will operate in a restricted area way from persons and property not involved in the

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operation. The aircraft will be flown based on VLOS at or below 500 feet AGL, so as to accommodate inspections of wind turbines. A NOTAM will be issued at least 24 hours before the flight is to occur, and the flight will be coordinated with the applicable FSDO.

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

NAG seeks an exemption from 14 C.F.R. § 91.7(a), which requires that a civil aircraft be in airworthy condition to be operated. The FAA has stated that no exemption is required to the extent that the requirements of Part 21 are waived or found inapplicable. Accordingly, NAG requests that the requirements for Section 91.7 be treated in accordance with FAR Part 21 Subpart H. *See* Grant of Exemption No. 11062, p. 19.

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

Pursuant to 14 C.F.R. § 91.9(b)(2):

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

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

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

NAG does not request an exemption from this section but instead notifies the FAA that, in accordance with FAA Office of Chief Counsel's Opinion dated August 8, 2014, the UAS flight manual, registration certificate and other documentation will be kept at the control station with the PIC during flight. The Chief Counsel's Office has held that for all UAS

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operations, this alternate method constitutes full compliance with the regulations. *See also* Grant of Exemption No. 11062, pp. 19-20, and Grant of Exemption No. 8607.

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

NAG seeks an exemption from 14 C.F.R. § 91.103, which requires a PIC to become familiar with specific information before each flight, including information contained in the FAA-approved Flight Manual on board the aircraft. The aircraft will not have a Flight Manual on board. The PIC will take all actions including reviewing weather, flight battery requirements, landing and takeoff distances and aircraft performance data before initiation of flight. Under these circumstances, the FAA has stated that no exemption is required. See Grant of Exemption No. 11062, p. 20. An exemption is requested to the extent that an FAA-approved Flight Manual is required.

Equivalent Level of Safety: An equivalent level of safety will be provided by following the NAG Manuals. The PIC will take all required preflight actions - including performing all required checklists and reviewing weather, flight requirements, battery charge, landing and takeoff distance, aircraft performance data, and contingency landing areas - before initiation of flight. The NAG Manuals will be kept at the ground station with the operator at all times.

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

NAG seeks an exemption from 14 C.F.R. § 91.109(a), which provides that “[n]o person may operate a civil aircraft (except a manned free balloon) that is being used for flight instruction unless that aircraft has fully functioning dual controls.” UASs and remotely piloted aircraft, by their design, do not have functional dual controls. Instead, flight control is accomplished through the use of a Ground Control Station (GCS) that communicates with the aircraft via radio communications.

Equivalent Level of Safety: When flight instruction is performed, no pilots will be on the aircraft and the GCS will be a safe distance from the aircraft and the public, causing no safety hazard. Given the size and speed of the InstantEye Mk-2, an equivalent level of safe training can still be performed without dual controls because no pilot or passengers are aboard the aircraft, and all persons will be a safe distance away in the event that the aircraft experiences any difficulties during flight instruction. In addition, NAG will conduct flight training at a remote facility away from population centers. These training flights will be conducted in a sterile area and will otherwise comply with the provisions in the NAG Manuals. Accordingly, NAG’s proposed method of operation provides superior levels of safety.

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I. 14 C.F.R. § 91.119(c): Minimum Safe Altitudes in Uncongested Areas

NAG requests an exemption from the minimum safe altitude requirements of 14 C.F.R. § 91.119(c). Section 91.119(c) prescribes that an aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure. NAG's Manuals provide for operations on wind farms away from congested populations areas, but in close proximity to wind turbines and towers. The FAA has already determined that relief from Section 91.119(c) is warranted for UAS operations in uncongested areas with similar flight restrictions as those imposed by NAG. See Grant of Exemption No. 11062, p. 20-21.

Equivalent Level of Safety: Compared to flight operations with rotorcraft weighing far more than the maximum weights proposed herein, and given the lack of flammable fuel, any risk associated with these operations is far less than those that presently exist with conventional aircraft. An equivalent level of safety will be achieved given the size, weight, and speed of the InstantEye Mk-2, as well as the location where it is operated. In order to avoid any risk to aircraft, flight operations will be restricted to 500 feet AGL or below. Other aircraft are already prohibited from operating closer than 500 from the wind turbine structures where NAG proposes to operate. This is airspace where other aircraft do not normally operate. As set forth in the NAG Manuals, the InstantEye Mk-2 will be operated in remote areas, away from persons or structures not involved in the operation. All persons who are not involved with NAG's operations will be required to be at least 500 feet from flight operations. This will pose no risk to the public because other aircraft are not operating in these areas. Attachment 3 includes maps of the wind turbine areas where NAG proposes to operate.

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

This petition seeks an exemption from 14 C.F.R. § 91.121, which requires a person operating an aircraft to maintain cruising altitude or flight level by reference to an altimeter that is set to the elevation of the departure airport. The InstantEye Mk-2 uses both barometric pressure sensors and GPS to determine altitude but does not have the ability to set in a current altimeter setting. An exemption is required to the extent that the InstantEye Mk-2 does not have a barometric altimeter setting. The altitude of the aircraft is monitored by the PIC on the ground control station and by the visual observer.

Equivalent Level of Safety: The FAA has stated that an equivalent level of safety can be achieved if the aircraft will be operated at or below 400 feet AGL and within visual line-of-sight in addition to GPS based altitude information relayed in real time to the operator. See Grant of Exemption No. 11062, p. 20-21. As the attached NAG Manuals indicate, the InstantEye Mk-2 will be operated at or below 500 feet AGL and otherwise complies with the limitations in the Grant of Exemption No. 11062.

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

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

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

Here, the technological limitations on InstantEye Mk-2 battery power means that no meaningful flight operations can be conducted while still maintaining a 30 minute reserve. The aircraft is battery powered with a maximum flight time of 20 to 30 minutes. NAG proposes that the maximum flight time for each operational flight will be 30 minutes. The aircraft will be safely landed with no less than the greater of (a) 20% battery life remaining or (b) five minutes of flight time remaining.

Equivalent Level of Safety: The FAA has stated that an equivalent level of safety is provided if the UAS flight is conducted under daytime VFR flight conditions using VLOS, and terminated with at least 25% reserve battery power still available. See Grant of Exemption No. 11062, p. 21-22. The NAG Manuals providing an equivalent level of safety by safely landing with no less than the greater of (a) 20% battery life remaining or (b) five minutes of flight time remaining and otherwise complying with the flight restrictions above.

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

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

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Equivalent Level of Safety: An equivalent level of safety will be achieved because maintenance and inspections will be performed in accordance with the NAG Manuals. This includes maintenance, overhaul, replacement, and inspection requirements for the aircraft and procedures to document and maintain maintenance records for the aircraft. This also includes preflight inspection procedures. *See* Exemption No. 11062, Docket No. FAA 2014-0352, at p. 14-15.

As provided in the NAG Manuals, flights will not be conducted unless a flight operations checklist is performed that includes all of the aircraft's components. The NAG Manuals also set requirements for maintenance log books and record keeping as well as routine and post-flight maintenance. The NAG Manuals set requirements for both annual maintenance and preventative maintenance.

VI. PUBLIC INTEREST

Granting NAG's petition for exemption furthers the public interest. National policy set by Congress favors early integration of UAS into the NAS in controlled, safe working environments such as those proposed in this petition. By granting this petition the FAA will fulfill Congress's intent of allowing UAS to operate safely in the NAS before completion of the rulemaking required under Section 332 of the Reform Act.

In addition, unmanned aircraft operations could replace the use of rope access or helicopters and small aircraft to monitor wind turbines. Traditionally, monitoring and inspection of the turbines involves an individual using either a manned aircraft or rope access to climb the large tower in order to visually inspect the turbine's blades for edge erosion, moisture intrusion, freeze/thaw cycling and lightning strikes, among other damage. Knowing the condition of the turbine's blades is essential to maximizing blade life. Thus, the inspections are intended to ensure that wind generation as a whole is both safe and reliable.

Yet performing this vital activity presents significant risk to the individual climbing the turbine or operating the manned aircraft in the vicinity of the turbines. For example, a 2011 newspaper article regarding wind and solar-powered installations noted accidents involving wind turbines have tripled in the last decade. At least 78 wind-turbine related fatalities have occurred since the 1970s, with more expected as wind installations spread.¹ Use of an unmanned aircraft, like NAG's proposed use of the InstantEye Mk-2 would significantly reduce the risk associated with turbine inspection.

¹ "More Accidents Feared as Wind, Solar-Powered Installations Spread," 8/14/2011 Los Angeles Times article located online at <http://www.toledoblade.com/Energy/2011/08/14/More-accidents-feared-as-wind-solar-power-installations-spread.html>.

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The InstantEye Mk-2 is approximately one pound, carries no passengers or crew, has no flammable fuel, as opposed to larger and more powerful helicopters and small airplanes. The public has an interest in reducing the hazards and emissions associated with alternate use of helicopters and small airplanes to conduct similar inspection operations.

Additionally, NAG's intended uses for the InstantEye Mk-2 have real-world benefits for the renewable energy industry and the public at large. NAGs will be able to inspect and survey wind turbine blades and towers supporting the renewable energy industry. The use of the InstantEye Mk-2 will also reduce the risks to human life associated with the traditional use of rope access for these operations. This program may prevent accidents and injuries, and there is a strong public interest in making these operations more safe and effective through the use of UASs.

VII. PRIVACY

All flights will occur on remote wind farms over private or controlled access property with the property owner's prior consent. All flights will be conducted in accordance with any federal, state or local laws regarding privacy.

VIII. SUMMARY FOR FEDERAL REGISTER

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

Notus Access Group seeks an exemption from the following rules for the commercial operation of a small unmanned aerial system to inspect wind turbine blades and towers for the renewable energy industry: 14 C.F.R Part 21, Subpart H; 14 C.F.R Part 27; 14 C.F.R § 45.23(b); 14 C.F.R. § 45.27(a); 14 C.F.R § 61.113; 14 C.F.R § 91.7(a); 14 C.F.R § 91.9(b)(2); 14 C.F.R § 91.9(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) & (b) 14 C.F.R § 91.203 (a) & (b); 14 C.F.R § 91.405(a); 14 C.F.R § 91.407(a)(l); 14 C.F.R § 91.409(a)(2); 14 C.F.R § 91.417 (a) & (b).

The exemption will enhance safety by reducing risk to the operator, the general public and property owners from the substantial hazards associated with performing equivalent work using traditional rope access or using conventional aircraft and rotorcraft.

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IX. ATTACHMENTS

- Attachment 1: AWR# IEMK220130521
- Attachment 2: Exemption No. 10968, Regulatory Docket No. FAA-2013-1127
- Attachment 3: NAG Flight Operations Areas– submitted confidentially under separate cover.
- Attachment 4: NAG Operations, Inspection, and Maintenance Manual - submitted confidentially under separate cover.
- Attachment 5: InstantEye Mk-2 Training Manual - submitted confidentially under separate cover.
- Attachment 6: InstantEye Mk-2 Operator Training Guide - submitted confidentially under separate cover.
- Attachment 7: InstantEye Mk-2 Specifications - submitted confidentially under separate cover.

Attachments 3 through 7 are confidential documents submitted under 14 C.F.R. § 11.35(b) and are exempt from disclosure under the Freedom of Information Act, 5 U.S.C. § 552 et seq., and any other requirements established by the FAA pursuant to Section 333 of the Reform Act). If you have any questions or require any additional information, please do not hesitate to contact the undersigned attorneys for Notus Access Group.

X. CONCLUSION

Satisfaction of the criteria provided in Section 333 of the Reform Act - size, weight, speed, operating capabilities, proximity to airports and populated areas, operation within visual line of sight, and national security considerations - provides more than adequate justification for the grant of the requested exemptions to permit NAG to operate the InstantEye Mk-2 for inspections of wind turbine blades and towers for the renewable energy industry.

Granting the requested exemption will benefit the public interest as a whole in many ways, including (1) significantly improving safety and reducing risk by alleviating human exposure

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to danger, and (2) improving the quality of services and decreasing operating costs compared with traditional rope access or conventional flight operations.

Respectfully submitted,
Morrison & Foerster LLP
Counsel for Notus Access Group

By



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Attachment 1



DEPARTMENT OF THE ARMY
US ARMY RESEARCH, DEVELOPMENT AND ENGINEERING COMMAND
AVIATION AND MISSILE RESEARCH, DEVELOPMENT, AND ENGINEERING CENTER
5400 FOWLER RD
REDSTONE ARSENAL, AL 35898-5000

RDMR-AEV

AWR IEMK220130521

21 May 2013

MEMORANDUM FOR: COL [REDACTED] Chief of Staff, Army Special Operations
Aviation (ARSOA), 2929 Desert Storm Drive, Fort Bragg, NC 28310-9110.

SUBJECT: Airworthiness Release (AWR) for Operation of UAS quad-rotor Instant Eye
known as IEMK2 Gen2 and Gen3 (TN 123556).

1. Scope: This memorandum constitutes a Qualification Level 3 Airworthiness Release (AWR) for the IEMK2 Gen2 and Gen3 to Army G-3 UAS Program Manager for operations in active restricted airspace, in accordance with "Memorandum of Agreement for Operation of Unmanned Aircraft Systems in the National Airspace System" (Appendix D-4) and Combat Operations.
2. Validity: This Airworthiness Release (AWR) terminates 30 May 2015 or upon change in configuration of the subject equipment, or upon issuance of a later AWR; whichever occurs first. This AWR applies to IEMK2 Gen2 and Gen3 UAS aircraft with the following interchangeable payloads 1.) IR Illumination 2.) Thermal Imaging and 3.) Ejector Rack that are owned and/or operated by the ARSOA.
3. Appendices: This memorandum and its appendices shall be briefed to flight crew prior to flight operations, carried in the log books and present in controlling Ground Control Station (GCS).

Appendix A - Restrictions and Operating Information
Appendix B - Configuration and Installation Detail
Appendix C - Inspections, Maintenance, and Logbook Instructions
Appendix D - Reference List

4. The points of contact (POC) are [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
fa Director
Aviation Engineering

FOR OFFICIAL USE ONLY

SUBJECT: Airworthiness Release (AWR) IEMK2 Gen2 and Gen3 Unmanned Aircraft System (UAS) (TN 123556).

Appendix A – Restrictions and Operating Information:

WARNING

The IEMK 2 Gen2 and Gen3 UAS have not completed full airworthiness qualification. All flight operations shall be conducted in a manner to minimize exposure to manned aircraft, populated ground areas and roadways. It shall not be flown across or adjacent to any in use by vehicles.

WARNING

The IEMK2 Gen2 and Gen3 UAS have not undergone complete electromagnetic environmental effects (E3) testing. The aircraft may experience erroneous data reports, and/or loss of control of aircraft, and/or loss of control of payload. Operators shall avoid sources of electromagnetic fields such as but not limited to transmitters, power lines, and cell towers.

WARNING

The IEMK2 Gen2 and Gen3 UAS Ground Control Station (GCS) have not undergone Human-Machine Interface (HMI) evaluation. The performance, accuracy and efficiency of the GCS are unknown. The system should be used with extreme caution.

WARNING

The IEMK2 Gen2 and Gen3 UAS do not have a sense and avoid system. Mid-air collision is a risk. All flight operations shall be conducted to ensure that minimum separation standards are maintained.

WARNING

Operation in and around personnel has the potential to cause injury; however the potential to cause serious injury is low. Operations should maintain safe stand-off distance from personnel, manned aircraft and roadways in use.

CAUTION

The IEMK2 Gen2 and Gen3 UAS have not been fully tested for the effects of lightning. Aircraft flight operations should proceed with caution when lightning activity is present.

SUBJECT: Airworthiness Release (AWR) IEMK2 Gen2 and Gen3 Unmanned Aircraft System (UAS) (TN 123556).

CAUTION

The IEMK2 Gen2 and Gen3UAS have not been qualified for the effects of precipitation. Flight operations should proceed with caution when measureable precipitation activity is present within the operational area.

CAUTION

The IEMK2 Gen2 and Gen3UAS have not been qualified to MIL-STD-810G environmental temperature extremes to demonstrate the equipment function satisfactorily/safely. Therefore; the system may not operate or may cease operation when exposed to extreme temperatures, rapid decompression, and other non-standard climatic conditions. If conditions are entered that are outside of past experience, proceed with caution.

CAUTION

The IEMK2 Gen2 and Gen3 UAS have not been qualified to MIL-STD-810G environmental temperature extremes. The aircraft shall not operate at altitudes or temperature conditions beyond which the batteries can safely provide power to the aircraft. The battery system shall be capable of providing adequate power to descend and land at an alternate ditching location.

1. The aircraft operating instructions, procedures, and limitations shall be in accordance with IEMK2 Gen2 and Gen3 UAS Instruction Manual (D-1), Safety Release for Instant Eye Unmanned Aircraft System (D-2), , Memorandum of Agreement (MOA) for Unmanned Aircraft Systems in the National Airspace between the FAA and DoD (D-4), Instant Eye Operator Training Manual (D-5), Instant Eye Mk-2 Configuration document (D-6), Instant Eye Mk-2 Payload Configuration (D-7) and this AWR. In the event of conflict between these documents, the information in this AWR shall prevail.
2. Flight of the IEMK2 Gen2 and Gen3UAS is restricted to Visual Meteorological Conditions (VMC).

WARNING

The IEMK2 Gen2 and Gen3UAS have not undergone Explosive Atmosphere testing. A serious fire or explosion may result if the aircraft is powered while flammable vapors are present during ground or flight operations. The precautions in paragraph 3 of this appendix shall be observed in order to ensure safe operations.

3. Due to lack of Safety of Flight (SOF) Explosive Atmosphere testing, the following precautions shall be observed in order to ensure safe flight:

SUBJECT: Airworthiness Release (AWR) IEMK2 Gen2 and Gen3 Unmanned Aircraft System (UAS) (TN 123556).

- a. The aircraft and GCS shall be un-powered if located less than 50ft to any refueling/defueling operations.
 - b. Lithium-Polymer (Li-Po) batteries are a revolution in battery technology and require special handling due to their extremely high capacity. Do not recharge batteries near flammable materials.
 - c. Ground operations of the aircraft shall be conducted at the greatest distance practical (no less than 50ft) from all other aircraft and fuel depots.
4. Use of data links is limited to approved frequencies for all ground and flight operations. Data link frequencies shall be de-conflicted through the local frequency manager/coordinator prior to conducting operations.
 5. An appropriate Lost Link Return Home Point shall be set such that the aircraft will not exit the approved operational airspace during lost link flight.
 6. When the aircraft is powered up it automatically sets that location as its return to base (RTB) coordinates. The system should be powered on at a suitable for RTB while the power is on.
 7. Any procedural deficiencies or flight anomalies detected during operations shall be corrected, annotated, and reported to the POC listed in paragraph 4 of this AWR.
 8. Antennae patterns and nulls have not been fully evaluated. The command and control link margin should be monitored closely until antenna performance has been validated and nulls are identified.
 9. Commander's Corner:

The IEMK2 Gen2 and Gen3 UAS Unmanned Aircraft System (UAS) has been issued an Airworthiness Qualification Level (AQL) 3 IAW AED SOP 70-62 UAS and has not met full airworthiness qualification or reliability demonstration requirements. AQL 3 is not based on traditional airworthiness substantiation from test data or analyses, and is issued for expendable UAS that are intended to regularly operate in Restricted Airspace and small UAS that intend to operate in combat zones. These UAS are not designed to accepted engineering standards and/or do not possess adequate engineering data to determine their compliance with acceptance standards. The data requirements for AQL 3 directly correlate to the proposed operational restrictions, area of operation, and allowed usage of the UAS. These systems have undergone a system level safety assessment that identifies the hazards for the intended operations. The AQL 3 AWR applies restrictions to mitigate the hazards identified in the system safety documentation. If the hazards cannot be mitigated through restrictions, the associated risk must be accepted at the appropriate level before the AWR is issued IAW AR 70-62.

SUBJECT: Airworthiness Release (AWR) IEMK2 Gen2 and Gen3 Unmanned Aircraft System (UAS) (TN 123556).

A signed risk determination was provided to AED by Headquarters United States Army Special Operations Aviation Command Memorandum for US Army Research Development Engineering Command Aviation and Missile Research, Development and Engineering Center, RDMR-AEV, Instant Eye Risk Determination (D-3)

SUBJECT: Airworthiness Release (AWR) IEMK2 Gen2 and Gen3 Unmanned Aircraft System (UAS) (TN 123556).

Appendix B – Configuration and Installation Detail:

Approved configurations for Instant Eye Mk-2 Gen2 and Gen3 is per references, Instant Eye Mk-2 Configuration document D-6 and Instant Eye Mk-2 Payload Configuration D-7.

SUBJECT: Airworthiness Release (AWR) IEMK2 Gen2 and Gen3 Unmanned Aircraft System (UAS) (TN 123556).

Appendix C – Inspections, Maintenance, and Logbook Instructions:

1. In the event any operating limit, or limits established by this release are exceeded, it is recommended that in addition to the normal entry in flight log all limits that were exceeded shall be entered/noted and appropriate inspections shall be performed prior to next flight.

2. Aircraft Logbook Entries:

a. A copy of this AWR shall be inserted in the logbook and the following entry shall be noted: "Operate within limitations and restrictions specified in the enclosed Airworthiness Release dated 21 May 2013."

b. A weight and balance record (form DD365 recommended) shall be maintained and kept on file in each aircraft's log book and weight and balance book maintained by the operator.

c. If a hard landing event occurs, make the following entry: "Perform visual inspection of aircraft as required by enclosed AWR dated 21 May 2013."

d. Make the following entry: "Perform EMI/EMC check IAW Pre-First Aircraft Flight Check List as required by the enclosed airworthiness release dated 21 May 2013." prior to first flight of each aircraft with this configuration. Upon check completion, a signed copy shall be provided to the POC of paragraph 4 of this AWR within 10 days of test.

SUBJECT: Airworthiness Release (AWR) IEMK2 Gen2 and Gen3 Unmanned Aircraft System (UAS) (TN 123556).

Appendix D - Reference List:

1. Instant Eye MK-2 UAS Instruction Manual, Rev 121912.
2. Safety Release for Instant Eye Small Unmanned Aircraft System (S-UAS), Maneuver Air Evaluation Directorate (TEAE-MA), 6 March 2013.
3. Memorandum for US Army Research Development Engineering Command Aviation and Missile Research, Development and Engineering Center, RDMR-AEV, Instant Eye Risk Determination, 15 May 2013.
4. Unmanned Aircraft Systems in the National Airspace System between the FAA and DoD Dated 24 September 2007.
5. Instant Eye Operator Training Manual, May 2013.
6. Instant Eye Mk-2 Configuration document, May 2013.
7. Instant Eye Mk-2 Payload Data, May 2013.

Attachment 2



U.S. Department
of Transportation

**Federal Aviation
Administration**

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

April 1, 2014

Exemption No. 10968
Regulatory Docket No. FAA-2013-1127

Mr. Dallas Cormier, SD1173
San Diego Gas & Electric, Sempra Energy
101 Ash Street
San Diego, CA 92101

Dear Mr. Cormier:

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

The Basis for Our Decision

By letters dated December 20, 2013 and January 14, 2014, you petitioned the Federal Aviation Administration (FAA) on behalf of San Diego Gas & Electric (SDGE) for an exemption from §§ 91.9(b)(2) and 91.203(a) and (b) of Title 14, Code of Federal Regulations (14 CFR). That exemption would allow SDGE to operate the InstantEye MK-2 N544L and N500VD unmanned aerial vehicles (UAVs) without carrying and displaying the airworthiness certificate, registration, flight manual, and any other required documentation onboard the aircraft. You requested that all required paperwork be located at the ground control station or within close proximity to the pilot in command.

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 SDGE.

The FAA has issued grants of exemption in circumstances similar in all material respects to those presented in your petition. In Grant of Exemption No. 8607 (copy enclosed), the FAA found it unnecessary to carry and display the airworthiness, certification, and registration documents in unmanned aircraft systems (UASs) and UAVs for the operations described by the petitioner. The original intent of the subject regulation was to display the airworthiness,

AFS-14-084-E

certification, and registration documents so they would be easily available to inspectors and passengers.

Having reviewed your reasons for requesting an exemption, I find that—

- they are similar in all material respects to relief previously requested in the enclosed Grant of Exemption No. 8607;
- the reasons stated by the FAA for granting the enclosed Grant of Exemption No. 8607 also apply to the situation you present; and
- a grant of exemption is in the public interest.

Our Decision

Under the authority contained in 49 U.S.C. §§ 106(f), 40113, and 44701, which the FAA Administrator has delegated to me, San Diego Gas & Electric is granted an exemption from 14 CFR §§ 91.9(b)(2) and 91.203(a) and (b) that allows SDGE to operate the InstantEye MK-2 N544L and N500VD UAVs without carrying and displaying the airworthiness certificate, registration, flight manual, and any other required documentation onboard the aircraft, subject to the following conditions and limitations described below.

Conditions and Limitations

1. Compliance with the conditions and limitations stipulated in the Certificate of Waiver or Authorization (COA) for San Diego & Gas Electric UAS operations.

Exemption No. 8607 was issued as a permanent exemption. The FAA, however, finds it in the best interest of safety to review this exemption every 2 years. This allows the FAA to ensure that there has been no change in circumstances or regulations from which the exemption is granted.

This exemption terminates on April 30, 2016, unless sooner superseded or rescinded.

Sincerely,

/s/

John S. Duncan
Director, Flight Standards Service

Enclosure