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

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

June 16, 2015

Exemption No. 11838
Regulatory Docket No. FAA–2015–1162

Mr. John Blickem
GIS Analyst
DuPage County Stormwater Management
421 N County Farm Road
Wheaton, IL 60187

Dear Mr. Blickem:

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 letter dated March 27, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of DuPage County Stormwater Management (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct flood control facility inspections.

See Appendix A for the petition submitted to the FAA describing the proposed operations and the regulations that the petitioner seeks an exemption.

The FAA has determined that good cause exists for not publishing a summary of the petition in the Federal Register because the requested exemption would not set a precedent, and any delay in acting on this petition would be detrimental to the petitioner.

Airworthiness Certification

The UAS proposed by the petitioner is a DJI Phantom 2 Vision +.

The petitioner requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*. In accordance with the statutory criteria provided in Section 333 of Public Law 112−95 in reference to 49 U.S.C. § 44704, and in

consideration of the size, weight, speed, and limited operating area associated with the aircraft and its operation, the Secretary of Transportation has determined that this aircraft meets the conditions of Section 333. Therefore, the FAA finds that the requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates,* and any associated noise certification and testing requirements of part 36, is not necessary.

The Basis for Our Decision

You have requested to use a UAS for aerial data collection[1]. The FAA has issued grants of exemption in circumstances similar in all material respects to those presented in your petition. In Grants of Exemption Nos. 11062 to Astraeus Aerial (*see* Docket No. FAA−2014−0352), 11109 to Clayco, Inc. (*see* Docket No. FAA−2014−0507), 11112 to VDOS Global, LLC (*see* Docket No. FAA−2014−0382), and 11213 to Aeryon Labs, Inc. (*see* Docket No. FAA−2014−0642), the FAA found that the enhanced safety achieved using an unmanned aircraft (UA) with the specifications described by the petitioner and carrying no passengers or crew, rather than a manned aircraft of significantly greater proportions, carrying crew in addition to flammable fuel, gives the FAA good cause to find that the UAS operation enabled by this exemption is in the public interest.

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

- They are similar in all material respects to relief previously requested in Grant of Exemption Nos. 11062, 11109, 11112, and 11213;
- The reasons stated by the FAA for granting Exemption Nos. 11062, 11109, 11112, and 11213 also apply to the situation you present; and
- A grant of exemption is in the public interest.

Our Decision

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. 106(f), 40113, and 44701, delegated to me by the Administrator, DuPage County Stormwater Management 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.

[1] Aerial data collection includes any remote sensing and measuring by an instrument(s) aboard the UA. Examples include imagery (photography, video, infrared, etc.), electronic measurement (precision surveying, RF analysis, etc.), chemical measurement (particulate measurement, etc.), or any other gathering of data by instruments aboard the UA.

Conditions and Limitations

In this grant of exemption, DuPage County Stormwater Management is hereafter referred to as the operator.

Failure to comply with any of the conditions and limitations of this grant of exemption will be grounds for the immediate suspension or rescission of this exemption.

1. Operations authorized by this grant of exemption are limited to the DJI Phantom 2 Vision + when weighing less than 55 pounds including payload. Proposed operations of any other aircraft will require a new petition or a petition to amend this exemption.

2. Operations for the purpose of closed-set motion picture and television filming are not permitted.

3. The UA may not be operated at a speed exceeding 87 knots (100 miles per hour). The exemption holder may use either groundspeed or calibrated airspeed to determine compliance with the 87 knot speed restriction. In no case will the UA be operated at airspeeds greater than the maximum UA operating airspeed recommended by the aircraft manufacturer.

4. The UA must be operated at an altitude of no more than 400 feet above ground level (AGL). Altitude must be reported in feet AGL.

5. The UA must be operated within visual line of sight (VLOS) of the PIC at all times. This requires the PIC to be able to use human vision unaided by any device other than corrective lenses, as specified on the PIC's FAA-issued airman medical certificate or U.S. driver's license.

6. All operations must utilize a visual observer (VO). The UA must be operated within the visual line of sight (VLOS) of the PIC and VO at all times. The VO may be used to satisfy the VLOS requirement as long as the PIC always maintains VLOS capability. The VO and PIC must be able to communicate verbally at all times; electronic messaging or texting is not permitted during flight operations. The PIC must be designated before the flight and cannot transfer his or her designation for the duration of the flight. The PIC must ensure that the VO can perform the duties required of the VO.

7. This exemption and all documents needed to operate the UAS and conduct its operations in accordance with the conditions and limitations stated in this grant of exemption, are hereinafter referred to as the operating documents. The operating documents must be accessible during UAS operations and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in this exemption and the procedures outlined in the operating documents,

the conditions and limitations herein take precedence and must be followed. Otherwise, the operator must follow the procedures as outlined in its operating documents. The operator may update or revise its operating documents. It is the operator's responsibility to track such revisions and present updated and revised documents to the Administrator or any law enforcement official upon request. The operator must also present updated and revised documents if it petitions for extension or amendment to this grant of exemption. If the operator determines that any update or revision would affect the basis upon which the FAA granted this exemption, then the operator must petition for an amendment to its grant of exemption. The FAA's UAS Integration Office (AFS−80) may be contacted if questions arise regarding updates or revisions to the operating documents.

8. Any UAS that has undergone maintenance or alterations that affect the UAS operation or flight characteristics, e.g., replacement of a flight critical component, must undergo a functional test flight prior to conducting further operations under this exemption. Functional test flights may only be conducted by a PIC with a VO and must remain at least 500 feet from other people. The functional test flight must be conducted in such a manner so as to not pose an undue hazard to persons and property.

9. The operator is responsible for maintaining and inspecting the UAS to ensure that it is in a condition for safe operation.

10. Prior to each flight, the PIC must conduct a pre-flight inspection and determine the UAS is in a condition for safe flight. The pre-flight inspection must account for all potential discrepancies, e.g., inoperable components, items, or equipment. If the inspection reveals a condition that affects the safe operation of the UAS, the aircraft is prohibited from operating until the necessary maintenance has been performed and the UAS is found to be in a condition for safe flight.

11. The operator must follow the UAS manufacturer's maintenance, overhaul, replacement, inspection, and life limit requirements for the aircraft and aircraft components.

12. Each UAS operated under this exemption must comply with all manufacturer safety bulletins.

13. Under this grant of exemption, a PIC must hold either an airline transport, commercial, private, recreational, or sport pilot certificate. The PIC must also hold a current FAA airman medical certificate or a valid U.S. driver's license issued by a state, the District of Columbia, Puerto Rico, a territory, a possession, or the Federal government. The PIC must also meet the flight review requirements specified in 14 CFR § 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate.

14. The operator may not permit any PIC to operate unless the PIC demonstrates the ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption, including evasive and emergency maneuvers and maintaining appropriate distances from persons, vessels, vehicles and structures. PIC qualification flight hours and currency must be logged in a manner consistent with 14 CFR § 61.51(b). Flights for the purposes of training the operator's PICs and VOs (training, proficiency, and experience-building) and determining the PIC's ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption are permitted under the terms of this exemption. However, training operations may only be conducted during dedicated training sessions. During training, proficiency, and experience-building flights, all persons not essential for flight operations are considered nonparticipants, and the PIC must operate the UA with appropriate distance from nonparticipants in accordance with 14 CFR § 91.119.

15. UAS operations may not be conducted during night, as defined in 14 CFR § 1.1. All operations must be conducted under visual meteorological conditions (VMC). Flights under special visual flight rules (SVFR) are not authorized.

16. The UA may not operate within 5 nautical miles of an airport reference point (ARP) as denoted in the current FAA Airport/Facility Directory (AFD) or for airports not denoted with an ARP, the center of the airport symbol as denoted on the current FAA-published aeronautical chart, unless a letter of agreement with that airport's management is obtained or otherwise permitted by a COA issued to the exemption holder. The letter of agreement with the airport management must be made available to the Administrator or any law enforcement official upon request.

17. The UA may not be operated less than 500 feet below or less than 2,000 feet horizontally from a cloud or when visibility is less than 3 statute miles from the PIC.

18. If the UAS loses communications or loses its GPS signal, the UA must return to a pre-determined location within the private or controlled-access property.

19. The PIC must abort the flight in the event of unpredicted obstacles or emergencies.

20. The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough available power for the UA to conduct the intended operation and to operate after that for at least five minutes or with the reserve power recommended by the manufacturer if greater.

21. Air Traffic Organization (ATO) Certificate of Waiver or Authorization (COA). All operations shall be conducted in accordance with an ATO-issued COA. The exemption holder may apply for a new or amended COA if it intends to conduct operations that cannot be conducted under the terms of the attached COA.

22. All aircraft operated in accordance with this exemption must be identified by serial number, registered in accordance with 14 CFR part 47, and have identification (N−Number) markings in accordance with 14 CFR part 45, Subpart C. Markings must be as large as practicable.

23. Documents used by the operator to ensure the safe operation and flight of the UAS and any documents required under 14 CFR §§ 91.9 and 91.203 must be available to the PIC at the Ground Control Station of the UAS any time the aircraft is operating. These documents must be made available to the Administrator or any law enforcement official upon request.

24. The UA must remain clear and give way to all manned aviation operations and activities at all times.

25. The UAS may not be operated by the PIC from any moving device or vehicle.

26. All Flight operations must be conducted at least 500 feet from all nonparticipating persons, vessels, vehicles, and structures unless:
    a. Barriers or structures are present that sufficiently protect nonparticipating persons from the UA and/or debris in the event of an accident. The operator must ensure that nonparticipating persons remain under such protection. If a situation arises where nonparticipating persons leave such protection and are within 500 feet of the UA, flight operations must cease immediately in a manner ensuring the safety of nonparticipating persons; and
    b. The owner/controller of any vessels, vehicles or structures has granted permission for operating closer to those objects and the PIC has made a safety assessment of the risk of operating closer to those objects and determined that it does not present an undue hazard.

    The PIC, VO, operator trainees or essential persons are not considered nonparticipating persons under this exemption.

27. All operations shall be conducted over private or controlled-access property with permission from the property owner/controller or authorized representative. Permission from property owner/controller or authorized representative will be obtained for each flight to be conducted.

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

If this exemption permits operations for the purpose of closed-set motion picture and television filming and production, the following additional conditions and limitations apply.

29. The operator must have a motion picture and television operations manual (MPTOM) as documented in this grant of exemption.

30. At least 3 days before aerial filming, the operator of the UAS affected by this exemption must submit a written Plan of Activities to the local Flight Standards District Office (FSDO) with jurisdiction over the area of proposed filming. The 3-day notification may be waived with the concurrence of the FSDO. The plan of activities must include at least the following:
    a. Dates and times for all flights;
    b. Name and phone number of the operator for the UAS aerial filming conducted under this grant of exemption;
    c. Name and phone number of the person responsible for the on-scene operation of the UAS;
    d. Make, model, and serial or N−Number of UAS to be used;
    e. Name and certificate number of UAS PICs involved in the aerial filming;
    f. A statement that the operator has obtained permission from property owners and/or local officials to conduct the filming production event; the list of those who gave permission must be made available to the inspector upon request;
    g. Signature of exemption holder or representative; and
    h. A description of the flight activity, including maps or diagrams of any area, city, town, county, and/or state over which filming will be conducted and the altitudes essential to accomplish the operation.

31. Flight operations may be conducted closer than 500 feet from participating persons consenting to be involved and necessary for the filming production, as specified in the exemption holder's MPTOM.

Unless otherwise specified in this grant of exemption, the UAS, the UAS PIC, and the UAS operations must comply with all applicable parts of 14 CFR including, but not limited to, parts 45, 47, 61, and 91.

This exemption terminates on June 30, 2017, unless sooner superseded or rescinded.

Sincerely,

/s/
John S. Duncan
Director, Flight Standards Service

Enclosures

DU PAGE COUNTY
STORMWATER MANAGEMENT

Daniel J. Cronin, County Board Chairman

STORMWATER MANAGEMENT ♦ STORMWATER REGULATORY SERVICES ♦ NATURAL RESOURCE PROTECTION
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U.S. Department of Transportation
Docket Operations
1200 New Jersey Ave., SE
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March 27, 2015

Re: Petition of DuPage County Stormwater Management for Exemption Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012

To Whom It May Concern:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (FMRA) and 14 C.F.R. Part 11, DuPage County Stormwater Management hereby applies for an exemption from Federal Aviation Regulations identified below.

This exemption is in accordance with protocols outlined in this petition for exemption, the enclosed UAS manufacturer's operations and/or instructions manual and any other requirements established by the FAA pursuant to Section 333 of the FRMA

For your convenience, the petition is organized as follows:

I. Petitioner's Description

II. Relevant Statutory Authority

III. Qualifications for Approval Under Section 333 of the Reform Act

IV. Description of Proposed Operations

V. Regulations From Which Exemption is Requested

- **A. 14 C.F.R. Part 21, Subpart H – Airworthiness Certificates and 14 C.F.R. § 91.203**
- **B. 14 C.F.R. Part 27 Airworthiness Standards: Normal Category Rotorcraft**
- **C. 14 C.F.R. § § 91.9(c), 45.23(b) and 45.27(a): Aircraft Marking and Identification Requirements**
- **D. 14 C.F.R. § 91.9(b)(2): Civil Aircraft Flight Manual in the Aircraft**
- **E. 14 C.F.R. § 91.7(a): Civil Aircraft Airworthiness**
- **F. 14 C.F.R. § 91.103: Preflight Action**
- **G. 14 C.F.R. § 91.109(a): Flight Instruction**
- **H. 14 C.F.R. § 91.119: Minimum Safe Altitudes**
- **I. 14 C.F.R. § 91.121: Altimeter Settings**
- **J. 14 C.F.R. § 91.151(a): Fuel Requirements for Flight in VFR Conditions**
- **K. 14 C.F.R. § 91.203(a) and (b): Carrying Civil Aircraft Certification and Registration**
- **L. 14 C.F.R. § 91.405(a), 91.407(a)(1), 91.409(a)(2); 91.417(a) and (b): Maintenance Inspections**

VI. Public Interest
VII. Privacy
VIII. Federal Registry Summary
IX. Conclusion

I. Petitioner's Description

DuPage County Stormwater Management was established in 1989 in recognition of the critical need to limit the reoccurrence of extensive flood damage to various communities within the County. The County owns and operates several flood control facilities that help to provide this essential flood relief. One of these facilities includes the Elmhurst Quarry Flood Control Facility. This 8,300 acre-foot facility (containing two lobes at a depth of 200') has the capacity to hold 8.7 billion gallons of flood water that would otherwise inundate several communities along Salt Creek. Other major facilities include the Fawell Dam on the West Branch of the DuPage River, and the Wood Dale/Itasca Reservoir. Because the operation of these various facilities is so critical, exhaustive maintenance and quality control inspection is one of our top priorities.

There is an inherent danger when working in the waterways, around large scale hydraulic structures, and near the high walls of a stone quarry. Our emphasis on maintenance inspections and efficient operation analysis has led us to explore better ways to perform these critical tasks. The safety of our communities and of our inspection team is paramount. We have an obligation to identify and control potentially dangerous situations through early intervention in the safest and most efficient manner possible.

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II. Relevant Statutory Authority

This petition for exemption is submitted to fulfill Congress' goal in passing Section 333(a) through (c) of the Reform Act. Congress has directed the FAA "to safely accelerate the integration of civil unmanned aircraft systems into the national airspace system." Pursuant to Section 333 of the Reform Act, the FAA Administrator is to consider whether certain unmanned aircraft systems may operate safely in the National Airspace ("NAS") before completion of the formal UAS rulemaking, based on the following considerations:

- The UAS's size, weight, speed, and operational capability;
- Operation of the UAS in close proximity to airports and populated areas; and
- Operation of the UAS within the visual line of sight of the operator.[2]

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" (emphasis added).[3]

Additionally, 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) (permitting exemptions from §§ 44701(a), (b) and §§ 44702 – 44716, *et seq*.). A party requesting an exemption must explain the reasons why the exemption: (1) would benefit the public as a whole, and (2) would not adversely affect safety (or how it would provide a level of safety at least equal to the existing rules). *See* 14 C.F.R. § 11.81 (petitions for exemption).

[2] *Id.* at § 333(b)(1).

[3] *Id.* at § 333(c).

III. Qualifications for Approval Under Section 333 of the Reform Act

The proposed operations in this petition for exemption qualify for expedited approval under Section 333 of the Reform Act. Each of the statutory criteria and other relevant factors are satisfied.

The proposed operations would permit the use of small and relatively inexpensive UAS under controlled conditions in airspace that is: (1) limited; (2) predetermined; (3) controlled as to access; and that (4) provides an increased level of safety beyond that existing when fixed or rotor wing aircraft are used to accomplish the same purpose.

Petitioner's UAS are rotorcraft, weighing approximately 3 pounds. They operate, under normal conditions, at low speed and have the capability to hover, and move in the vertical and horizontal plane. Petitioner's UASs will operate in line of sight and will only operate within a sterile area described in the enclosed Manual.[4]

Given the small size of the UASs involved and the restricted sterile environment within which they will operate, this petition exemption falls within the zone of safety *i.e.,* an equivalent level of safety, in which Congress desired the FAA to permit commercial UAS operations by exemption pending completion of formal rulemaking. Also, due to the size of the UASs and the restricted area in which the UASs will operate, approval of the application presents no national security issue.

Considering the clear direction in Section 333 of the Reform Act, the authority contained in the Federal Aviation Act, as amended, the equivalent level of safety surrounding the proposed operations, and the significant public benefit, the grant of the requested exemptions is also in the public interest.

Accordingly, Petition respectfully requests the FAA grant the requested exemption without delay.

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[4] *See* Manual Sections 11

IV. Description of Proposed Operations

The enclosed Manual describes, in detail, the policies and procedures for Petitioner's proposed UAS operations. To assist the FAA in its safety assessment of Petitioner's proposed UAS operations, below is a summary of operational limitations and conditions which will ensure an equivalent or higher level of safety to operations conducted under current regulatory guidelines:

1. The UAS will weigh approximately 3 pounds.

2. Flights will be operated within line of sight of a pilot and/or observer.

3. Maximum total flight time for each operational flight will be limited to the amount of time the UAS can be flown and still maintain a reserve battery power of no less than 25%.

4. Flights will be operated at an altitude of no more than 400 feet above ground level ("AGL").

5. Flights will be operated at a lateral distance of least 100 feet from any inhabited structures, buildings, vehicles, vessels, or people not associated with the operation or who have not signed a waiver in advance of the operation.

6. Minimum crew for each operation will consist of the UAS Pilot, a Visual Observer, and a Sensor Operator.

7. The UAS Pilot will be an FAA licensed airman with at least a private pilot's certificate and second class medical certificate.

8. The UAS Pilot will be Pilot in Command ("PIC"). If a pilot certificate holder other than the UAS Pilot, who possesses the necessary PIC qualifications, is also present, that person can be designated as PIC.

9. The UAS will operate only within a confined "Sterile Area" as defined in the Manual.[5]

10. Prior to the operation, a project packet will be created which includes all safety and operational information necessary to safely carry out the flight.

11. A briefing will be conducted in regard to the planned UAS operations prior to each day's missions. It will be mandatory that all personnel who will be performing duties within the boundaries of the safety perimeter be present for this briefing.

12. Pilot, Visual Observer and Sensor Operator will at all times be able to communicate by voice and/or text.

13. Pilot, Visual Observer and Sensor Operator will have been trained in operations of UAS generally and received up-to-date information on the particular UAS to be operated as required in the Manual.

14. Written and/or oral permission from the relevant property holders will be obtained.

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

16. The operator will file a FAA Form 7711-1, or its equivalent, as modified in light of the requested exemption, with the appropriate Flight Standards District Office ("FSDO").

17. If the UAS loses communications or loses its GPS signal, the UAS will have the capability to return to a pre-determined location within the Sterile Area and land.

18. Contingency plans will be in place to safely terminate flight if there is a loss of communication between the pilot and the observer.

19. The UAS will have the capability to abort a flight in case of unpredicted obstacles or emergencies.

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

V. Regulations From Which Exemption is requested

The Federal Aviation Act expressly grants the FAA the authority to issue exemptions. This statutory authority, by its terms, includes exempting civil aircraft, as the term is defined under § 40101 of the Act, including UASs, from its safety regulations and minimum standards when the Administrator decides a requested exemption is in the public interest.[6]

Petitioner seeks an exemption from several interrelated provisions of 14 C.F.R. Parts 21, 45 and 91 for purposes of conducting Flare Stack inspections using UASs. Listed below are (1)

the specific sections of 14 C.F.R. for which exemption is sought, and (2) the operating procedures and safeguards that Petitioner has established which will ensure a level of safety better than or equal to the rules from which exemption is sought.[7]

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

Petitioner seeks an exemption from 14 C.F.R. Part 21, Subpart H, which establishes the procedural requirements for the issuance of airworthiness certificates as required by 14 C.F.R. § 91.203(a)(1). Given the size and limited operating area associated with the UAS to be utilized by the Petitioner, an exemption from Part 21, Subpart H, 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 particular UAS.

In all cases, an analysis of these criteria demonstrates that the UAS operated without an airworthiness certificate, in the restricted environment and under the conditions proposed, will be at least as safe as, or safer than, a conventional rotorcraft operating with an airworthiness certificate without restrictions and conditions of the proposed UAS operations.

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

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

Equivalent Level of Safety

The UAS to be operated hereunder, DJI Phantom 2 Vision + multi-rotor rotorcraft, weighs approximately 3 pounds, carries neither a pilot nor passenger, carries no explosive materials or flammable liquid fuels, and operates exclusively within a secured and sterile area. Unlike other civil aircraft, the proposed operations will be controlled and monitored by the operator, as well as an observer and sensor operator, pursuant to the Manual's requirements. Moreover, the FAA will have advance notice of all operations conducted under this exemption.

These safety enhancements, which already apply to civil aircraft operated in connection with existing inspection operations, provide a greater degree of safety to the Petitioner's employees, members of the public, and property owners than conventional operations conducted with airworthiness certificates issued under 14 C.F.R. Part 21, Subpart H. Lastly, application of these same criteria demonstrates that there is no credible threat to national security posed by the UAS, due to its size, speed of operation, lack of explosive materials or flammable liquid fuels, and inability to carry a substantial external load.

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 Petitioner's UAS would otherwise require certification under Part 27, Petitioner seeks an exemption from Part 27's airworthiness standards for the same reasons identified in the exemption request from 14 C.F.R. Part 21, Subpart H.

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

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

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

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

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

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

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

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

Exemption from 14 C.F.R. § 45.23(b) is warranted because the UAS has no entrance to the cabin, cockpit, or pilot station on which the word "Experimental" can be placed. Moreover, given the size of the UAS, two-inch lettering will be impossible.

Given the nature of the specific relief sought by this exemption request, Petitioner requires relief from the associated marking and identification requirements of § 45.27(a) and § 91.9(c), which would require compliance with § 45.23(b).

Equivalent Level of Safety

The equivalent level of safety for exemptions to the aircraft marking and identification requirements of §§ 91.9(c), 45.23(b) and 45.27(a) will be provided by having the UAS marked on its fuselage as required by § 45.29(f).

The FAA has previously issued the following exemptions to the aircraft marking requirements of § 45.23(b): Exemption Nos. 10700, 10167 and 10167A.

D. 14 C.F.R. § 91.9(b)(2): Civil Aircraft Flight Manual in the Aircraft

Petitioner seeks an exemption from the flight manual requirements of 14 C.F.R. § 91.9(b)(2), which states:

> (b) 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 its physical dimensions, configuration and load capacity, the UAS has no ability to carry such a manual on the aircraft, not only because there is no pilot on board, but because there is simply no room or capacity to carry such an item on the aircraft.

Equivalent Level of Safety

The safety related purpose of this manual requirement can be equally satisfied by maintaining the UAS flight manual at the ground control point where the pilot flying the UAS will have immediate access to it. Accordingly, Petitioner requests an exemption from 91.9(b)(2)'s flight manual requirements, on the condition that the UAS flight manual be available at the control point during each operation.

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

Petitioner seeks an exemption from 14 C.F.R. § 91.7(a), which requires that a civil aircraft be in airworthy condition to be operated. Inasmuch there will be no airworthiness certificate issued for the UAS, should this exemption be granted, no FAA regulatory standard will exist for determining airworthiness.

Equivalent Level of Safety

The DJI Phantom 2 Vision + has a stellar safety record, demonstrating that the UAS is airworthy. Further, given the size of the UAS and the requirements contained in the Manual for maintenance and pre-flight safety check lists, an equivalent level of safety will be provided.

The FAA has issued the following exemptions to this regulation: Exemption Nos. 8607, 8737, 8738, 9299, 9299A, 9565, 9565B, 10167, 10167A, 10602, 32827, and 10700.

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

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

Equivalent Level of Safety

An equivalent level of safety will be provided by following the Aircraft Operations Manual. The PIC will take all required preflight actions - including reviewing weather, flight battery requirements, landing and takeoff distance, and aircraft performance data - before initiation of flight. The Aircraft Operations Manual will be kept at the ground station with the operator at all times.

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

Petitioner 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 box that communicates with the aircraft via radio communications.

Equivalent Level of Safety

Given the size and speed of the UAS, an equivalent level of safe training can still be performed without dual controls because no pilot or passengers are aboard the UAS, and all persons will be a safe distance away in the event that the UAS experiences 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. Exemptions include: Nos. 5778K and 9862A.

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

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

To provide the intended flood control facility inspections, the UAS is always operated below 400 feet AGL. Additionally, due the nature of the proposed operations, the UAS will maintain a lateral distance of at least 100 feet from inhabited structures, buildings, vehicles, and vessels, and from people not associated with the operation.

Equivalent Level of Safety

Compared to flight operations with rotorcraft weighing far more than the maximum 25 pounds 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 UAS, as well as the location where it is operated. As set forth in the Manual, the UAS will be operated in a restricted and sterile area, where buildings and people will not be exposed to operations without their pre-obtained consent. Because of the advance notice to the property owners and participants, all affected individuals will be well aware of the planned flight operations as set forth in the Manual.

Furthermore, by operating at such lower altitudes, the UAS will not interfere with other aircraft that are subject to the minimum safe altitude regulations. Finally, the successful safety record of the DJI Phantom 2 Vision + demonstrates that the UAS can be safely used at these lower altitudes and closer operating environments.

I. 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 or barometric pressure. An exemption is required because the UAS does not have a barometric altimeter, but rather a GPS altitude read out.

Equivalent Level of Safety

An equivalent level of safety will be achieved by following the procedures set forth in the Manual. As prescribed in the Manual, the operator will confirm the altitude of the launch site shown on the GPS altitude indicator before flight. Moreover, the PIC will use the GPS altitude indicator built in to the UAS to constantly monitor height, thus ensuring operation at safe altitudes.

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

Petitioner 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 battery powering the DJI Phantom 2 Vision + provides approximately 15 minutes of powered flight. To meet the 30 minutes reserve requirement in 14 C.F.R. § 91.151, UAS flights could not be conducted. Given the limitations on the UAS's proposed flight area and the location of its proposed operations within a predetermined area, a safety margin based on a reserve amount of battery life is needed. Petitioner will not be conducting any UAS flights at night.

Equivalent Level of Safety

An equivalent level of safety will be achieved because the operations will be conducted on-site without significant transit time by the UAS. All flights will be planned to be terminated with no less than 25% reserve battery power still available. This restriction would be more than adequate to return the UAS safely to the ground and its planned landing zone from anywhere in its limited operating area even in the event of an unexpected occurrence. Operation of the UAS

with less than 30 minutes of reserve fuel does not include the type of risks that Section 91.151(a) was intended to alleviate given the size and speed of the small UAS, and the proximity of the flight operation to the landing zone. Moreover, operation will be limited to controlled areas where only people and property owners, or official representatives who have signed waivers. will be allowed.

This request for exemption falls within the scope of prior exemptions, including Exemption Nos. 10673, 2689F, 5745, 10673, and 10808.

K. 14 C.F.R. § 91.203(a) and (b): Carrying Civil Aircraft Certification and Registration

Petitioner seeks an exemption from civil aircraft certification and registration requirements of 14 C.F.R. § 91.203(a) and (b). The regulation states in pertinent part:

> (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.

In addition to the fact that Petitioner is seeking an exemption from the airworthiness certificate requirements, an exemption to this regulation is necessary because: (1) the UAS's configuration, load capacity and size does not allow it to carry certification and registration documents; (2) the UAS does not have a cabin or cockpit entrance at which documents could be displayed; and (3) there are no passengers or crew for whom the certificates need to be displayed.

Equivalent Level of Safety

To the extent these regulations are applicable to the proposed UAS operations, an equivalent level of safety will be achieved by keeping these documents at the ground control point where the PIC will have immediate access to them.

The FAA has issued numerous exemptions to this regulation, including: Exemption Nos. 9565, 9665, 9789, 9789A, 9797, 9797A, 9816A, and 10700.

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

Petitioner also 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 to these regulations is needed because Part 43 and these sections only apply to aircraft with an airworthiness certificate, which the UAS will not have.

Equivalent Level of Safety

An equivalent level of safety will be achieved because maintenance and inspections will be performed in accordance with the Aircraft Operations Manual as referenced in the Manual. As provided in the Manual, the operator will ensure that the UAS is in working order prior to initiating flight, perform required maintenance, and keep a log of any maintenance performed. The operator is the person most familiar with the aircraft and best suited to maintain the aircraft in an airworthy condition to provide the equivalent level of safety.

If mechanical issues arise, the UAS's size and carrying capacity, and the fact that flight operations will only take place in restricted areas for limited periods of time during daylight hours, creates less risk than that associated with conventional rotorcraft performing the same operation.

VI. PUBLIC INTEREST

Granting DuPage County Stormwater Management's exemption request furthers the public interest. National policy set by Congress favors early integration of UAS into the national airspace in controlled, safe working environments such as those proposed in this petition.

By their nature, flood control facilities present unique difficulties for persons attempting to inspect and maintain this vital piece of infrastructure. Sending personnel to inspect dam structures and high walled flood storage facilities puts personnel at risk. These risks can be avoided by using a small UAS under controlled conditions to photograph and document the state of the equipment. This helps to facilitate repairs and identify issues before they become problems. The public deserves to have the highest level of quality control as they rely heavily on these facilities for flood protection. Employing the UAS in this capacity will further help to insure their safety.

VII. Privacy

All flights will occur over property with the property owner's prior consent and knowledge.

VIII. Federal Registry Summary

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

DuPage County Stormwater Management seeks an exemption from the following rules:

14 CFR Part 21, Subpart H; 14 CFR Part 27; 14 CFR 45.23(b); 14 CFR 91.7(a); 14 CFR 91.9(b)(2); 14 CFR 91.103; 14 CFR 91.109(a); 14 CFR 91.119; 14 CFR 91.121; 14 CFR 91.151(a); 14 CFR 91.203 (a) & (b); 14 CFR 91.405(a); 14 CFR 91.407(a)(1); 14 CFR 91.409(a)(2); 14 CFR 91.417 (a) & (b).

Approval of these exemptions allowing commercial operations of small and lightweight unmanned aircraft ("UAS") to conduct flare stack inspections will enhance safety by reducing risk to DuPage County Stormwater Management employees, the general public and property owners.

The DJI Phantom 2 Vision + UAS, weighing approximately 3 pounds and powered by batteries, eliminates virtually all of that risk given the reduced mass and lack of combustible fuel carried on board. The UAS is transported to the designated survey area set up. It is not flown from an external location to the work-site. The UAS will carry no passengers or crew and, therefore, will not expose them to the risks associated with manned aircraft flights.

The operation of this small UAS will provide an equivalent level of safety, supporting the grant of the exemptions requested herein, including exempting the applicant from the requirements of Part 21 and allowing commercial operations. These lightweight UASs operate at slow speeds, close to the ground, and in a sterile environment. As a result, they are far safer than conventional aerial survey and inspection operations conducted with fixed wing aircraft or helicopters.

IX. Conclusion

Satisfaction of the criteria provided in Section 333 of the Reform Act of 2012—size, weight, speed, operating capabilities, proximity to airports and populated areas and operation within visual line of sight and national security—provides more than adequate justification for the grant of the requested exemptions to permit DuPage County Stormwater Management to operate a UAS in support of its flood control facility inspections in accordance with the manual appended hereto.

If additional information is required, or if you have any questions regarding this Petition for Exemption, please contact the undersigned or at:

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