



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

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

June 30, 2015

Exemption No. 11953
Regulatory Docket No. FAA-2015-1407

Mr. Kevin Kianka, P.E.
Director of BIM/Modeling Program
Haag 3D Solutions, LLC
625 Industrial Boulevard
Sugar Land, TX 77478

Dear Mr. Kianka:

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 April 28, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Haag 3D Solutions, LLC (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct mapping, inspection and photography of landfills, mining facilities, utilities, oil and gas facilities, agriculture, construction sites, forensic engineering assessments, damage assessments and fire investigation applications.

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 are the DJI Phantom 3, DJI Phantom 2 Vision+, and DJI Phantom 2.

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 collection¹. 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, Haag 3D Solutions, LLC 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

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.

the extent necessary to allow the petitioner to operate a UAS to perform aerial data collection. This exemption is subject to the conditions and limitations listed below.

Conditions and Limitations

In this grant of exemption, Haag 3D Solutions, LLC 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 3, DJI Phantom 2 Vision+, and DJI Phantom 2 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.nts.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 July 31, 2017, unless sooner superseded or rescinded.

Sincerely,

/s/

John S. Duncan

Director, Flight Standards Service

Enclosures



625 Industrial Blvd
Sugar Land, TX 77478
Haag3DSolutions.com

281.313.9700
281.313.9707 fax

April 28, 2015

U.S. Department of Transportation
Federal Aviation Administration
Document Management System
1200 New Jersey Ave., SE
Washington, D.C. 20590

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

Dear Sir or Madam:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012, Pub. L. No. 112-95, 126 Stat.11 (amending 49 U.S.C.) (hereinafter, the “Reform Act”) and 14 C.F.R. Part 11, Haag 3D Solutions LLC (“H3DS”), a developer and operator of small unmanned aircraft systems (singularly a “sUAS” or cumulatively “sUASs”) seeks an exemption from the Federal Aviation Regulations listed below, to allow commercial operation of its sUASs.

Haag 3D Solutions, LLC a division of Haag Engineering Co., Forensic Engineers & Consultants since 1924, provides professional 3D geospatial solutions for all types of design and construction projects. Haag 3D Solutions, LLC (H3DS) is a technology and services company specializing in the application of 3D imaging and BIM technologies delivering highly accurate and reliable as built documentation for both public and private sector clients. Having completed hundreds of 3D Laser Scanning, mapping and BIM assignments throughout North America, the Haag 3D Solutions team has gained a uniquely practical familiarity with 3D Laser Scanning technology and processes and offers real solutions to a wide variety of measurement and physical documentation tasks.

As described more fully below, the requested exemption would permit the operation of small, unmanned sUAS under controlled condition in airspace that (a) is limited, (b) is predetermined, (c) is controlled as to access, and (d) would provide safety enhancements to the already safe operations in the mapping industry. Approval of this exemption would thereby enhance safety and fulfill the Secretary of Transportation’s responsibilities to “... establish requirements for the safe operation of such aircraft systems in the national airspace system.” Reform Act 333 (c).

The name and address of the applicant (“Applicant”):

Haag 3D Solutions, LLC
Attn: Kevin Kianka, P.E.
625 Industrial Blvd
Sugar Land, TX 77478
TEL: 281-313-9700
FAX: 281-313-9707
Email: kkianka@haagglobal.com

The Applicant hereby requests exemption from the following FARs:

- 14 C.F.R. 21, subpart H
- 14 C.F.R. 61.3
- 14 C.F.R. 61.113(a)&(b)
- 14 C.F.R. 61.133(a)
- 14 C.F.R. 91.9(b)(2)
- 14 C.F.R. 91.103(b)
- 14 C.F.R. 91.105
- 14 C.F.R. 91.109(a)
- 14 C.F.R. 91.119
- 14 C.F.R. 91.121
- 14 C.F.R. 91.151(a)
- 14 C.F.R. 91.203(a) & (b)
- 14 C.F.R. 91.319(a)(1)
- 14 CFR 91, Subpart E (91.405, 91.407, 91.409, 91.417)

The requested exemption would authorize H3DS to conduct commercial operations using the DJI Phantom 3, DJI Phantom 2 Vision+, and DJI Phantom 2 for mapping, inspection and photography of landfills, mining facilities, utilities, oil & gas facilities, agriculture, construction sites, forensic engineering assessments, damage assessments and fire investigation applications.

In order to ensure at least an equivalent level of safety to currently authorized operations using manned aircraft, all operations will be subject to the strict operating requirements defined in the H3DS UAS Flight Operations Manual and Preflight Checklist (H3DS will provide these documents if required, but requests that the FAA treat them as proprietary under 14 C.F.R. 11.35(b) and not include this document in the public docket). Additionally, this petition for exemption is supported by the information contained in the Phantom 2 Vision+ User Manual, Phantom 2 User Manual, Phantom 2 Vision Pilot Training Guide, and the Smart Flight Battery Safety Guidelines (hereafter collectively referred to as “Manufacturer’s Operations Manuals”).

All H3DS UAS will be operated only by individuals who hold at least an FAA issued private, recreational, or sport pilot certificate and who have successfully completed H3DS’s UAS Training Program (the H3DS UAS Training Program Outline will be submitted separately if required and H3DS requests that the FAA treat this document as proprietary under 14 C.F.R. 11.35(b) and not include this document in the public docket).

The characteristics of the sUAS, detailed sUAS operator requirements, and sUAS operating parameters given below will ensure that all H3DS UAS operations are carried out with an equivalent or higher level of safety than currently authorized manned aircraft operations. The details below regarding H3DS’s intended UAS applications provide clear evidence that approval of this exemption is in the public interest.

CHARACTERISTICS OF THE sUAS

The Phantom 3, Phantom 2 Vision+, and Phantom 2 are all very similar UAS. One exception is that the Phantom 3 and Vision+ include an integrated camera, while a third party camera can be affixed to the Phantom 2. The Phantom 2 Vision+ and Phantom 2 have a diagonal motor-to-motor distance of approximately 14 inches. The Phantom 3 is approximately 27 inches across, measured diagonally and including the propellers. All three UA are constructed primarily of frangible materials (plastic) and weigh less than 3 pounds each. The Vision+ and Phantom 2 are powered by a 5200 mAh 3S LiPo battery. The Phantom 3 is powered by a 4480 mAh 4S LiPo battery.

The max flight speed of the Phantom 2 Vision+ and the Phantom 2 is approximately 34 mph, while the max flight speed of the Phantom 3 is approximately 36 mph. All three UA contain an on-board GPS and an inertial measurement unit for flight stabilization and automatic failsafe return to home in case of a lost control signal. Additionally, these UAS offer geo-fencing and max altitude features to restrict the maximum vertical and horizontal distance the aircraft will fly from its home point. The Phantom 3 and Vision+ offer the added feature of displaying real time flight data, including battery status, altitude and distance from home, within the DJI App.

Each sUAS operated by H3DS for commercial use will be registered in accordance with 14 C.F.R. Part 47, and will be marked in accordance with 14 C.F.R. Part 45, , Subpart C, in a size as large as practical for the size of the sUAS.

All sUASs operated by H3DS will be maintained in accordance with the manufacture's maintenance, overhaul, replacement, inspection, and life limit requirements for the aircraft and aircraft components and all pertinent instructions in the user manuals. Repairs, component changes, and software/firmware updates will be recorded in the sUAS's maintenance log. Maintenance log entries will include the date, sUAS ID number, registration number, current sUAS flight time, a description of work performed, and the name of the individual who completed the work. Any UAS that has undergone maintenance or alterations that affect the sUAS operation or flight characteristics, e.g. replacement of a flight critical component, must undergo a functional test flight, prior to use in any commercial operations. The functional test flight must be conducted in such a manner so as to not pose an undue hazard to persons and property. The PIC who conducts the functional test flight must make an entry in the aircraft records. A pre-flight inspection of the sUAS will be completed by the PIC prior to each flight operation as specified in the H3DS sUAS Flight Operations Manual. 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. All H3DS UAS will comply with all applicable manufacturer safety bulletins.

Additional information on the aircraft specifications, performance limitations, operating procedures, and pre-flight inspections is contained in the attached documents. The safety and reliability of the DJI Phantom 2 Vision+ and DJI Phantom 2 sUAS is further supported by the fact that numerous FAA exemptions have previously been approved for their use in commercial operations. As noted above, the DJI Phantom 3 is very similar to these sUAS and incorporates additional safety features.

UAS OPERATOR REQUIREMENTS

All H3DS sUAS operators will hold at least an FAA issued private, recreational, or sport pilot certificate and will have successfully completed H3DS's UAS Training Program. Completion of the

H3DS sUAS Training Program will ensure safe operations by not allowing any PIC to operate a sUAS unless that PIC has demonstrated, that he/she is able to safely operate the sUAS in a manner consistent with the exemption, including evasive and emergency maneuvers and maintaining appropriate distances from people, vessels, vehicles and structures. All operators will either meet the flight review requirements specified in 14 CFR § 61.56 or will annually complete and log at least 4 hours of ground instruction with a certified flight instructor (CFI) covering regulations and issues pertinent to commercial operation of the Phantom 3, Phantom 2 Vision+ and Phantom 2 sUAS.

The individual acting as PIC of a sUAS will be identified prior to any flight and will not change once the flight has begun. The PIC is the individual in operational control of the flight operation from beginning to end and is responsible for safe flight of the sUAS. All PIC flight hours used to demonstrate qualifications and currency will be logged in a manner consistent with 14 CFR § 61.51(b).

In order to act as PIC, all H3DS sUAS operators will hold a current FAA airman medical certificate or a valid U.S. driver's license issued by a state, the District of Colombia, Puerto Rico, a territory, a possession, or the Federal government.

UAS OPERATING PARAMETERS

In order to provide for a level of safety at least equivalent to operations conducted using manned aircraft, all H3DS commercial sUAS operations will be conducted in accordance with the following specific operating limitations:

- The sUAS may not be operated at a speed exceeding 30 knots (34 miles per hour). In no case will the sUAS be operated at airspeeds greater than the maximum sUAS operating airspeed recommended by the aircraft manufacturer.
- All operations shall be conducted in accordance with an ATO-issued COA.
- All sUAS operations will occur at or below 500 ft AGL or the maximum altitude specified in the COA limitations, unless the purpose of the flight is to inspect a building or structure which is taller than 500 ft. If the purpose of the flight is to inspect a building or structure which is taller than 500 ft then the max altitude of the sUAS will be restricted to 20 ft above the highest point of that building or structure. All altitudes must be reported in feet AGL.
- No sUAS will be operated within 3 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 H3DS. The letter of agreement with the airport management must be made available to the Administrator or any law enforcement official upon request.
- No sUAS will be operated within class B, C, D or E airspace unless a letter of agreement from the controlling ATC office is obtained or the flight is otherwise permitted by a COA issued to H3DS. The letter of agreement from ATC must be made available to the Administrator or any law enforcement official upon request.

- The sUAS 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.
- All operating documents and a grant of exemption must be accessible during sUAS operations and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in the grant of exemption and the procedures outlined in the operating documents, the conditions and limitations in the grant of exemption take precedence and must be followed. Otherwise, the PIC must follow the procedures as outlined in the operating documents. H3DS may update or revise its operating documents. However, it is H3DS's responsibility to track such revisions and present updated and revised documents to the Administrator or any law enforcement official upon request. H3DS must also present updated and revised documents if it petitions for extension or amendment to the grant of exemption. If H3DS determines that any update or revision would affect the basis upon which the FAA granted the exemption, then H3DS must petition for an amendment to the grant of exemption.
- sUAS 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. The sUAS 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.
- Prior to each flight the PIC must inspect the sUAS to ensure that it is in a condition for safe flight. If the inspection reveals a condition that affects the safe operation of the sUAS, the aircraft is prohibited from operating until the necessary maintenance has been performed and the sUAS is found to be in a condition for safe flight. All maintenance and alterations must be properly documented in the aircraft records.
- Any sUAS that has undergone maintenance or alterations that affect the sUAS operation or flight characteristics, e.g. replacement of a flight critical component, must undergo a functional test flight. The PIC who conducts the functional test flight must make an entry in the aircraft records.
- If the UAS loses communications or loses its GPS signal, the sUAS must return to a predetermined location.
- The PIC must abort the flight in the event of unpredicted obstacles or emergencies.
- The PIC is prohibited from beginning a flight unless the sUAS's battery level is at 75% or higher. The PIC must begin returning the sUAS to the designated landing area when the battery level drops below 25%.
- Documents used by the operator to ensure the safe operation and flight of the sUAS 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 sUAS any time the aircraft is operating. These documents must be made available to the Administrator or any law enforcement official upon request.
- The sUAS must remain clear and give way to all manned aviation operations and activities at all times.
- The sUAS may not be operated by the PIC from any moving device or vehicle.

- sUAS will not be operated directly over nonparticipating persons unless barriers or structures are present that sufficiently protect nonparticipating persons from the UA and/or debris in the event of an accident. UA will not be operated over any open-air assembly of people.
- Any incident, accident, or flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by the applicable COA will be reported to the FAA's UAS Integration Office (AFS-80) within 24 hours. Accidents will be reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: www.nts.gov.

APPLICATIONS AND PUBLIC INTEREST

The requested exemption would allow H3DS to operate the DJI Phantom 3, Phantom 2 Vision+, and Phantom 2 for the purposes of forensic engineering inspections and fire cause and origin investigations. These inspections and investigations are completed on both residential and commercial properties and are typically conducted in support of the property insurance industry. Use of sUAS for these applications will offer significant advantages related to safety, time, and cost. Most properties throughout the country are insured, and property owners have an interest in insurance underwriting, coverage, and claims processing; therefore it is clear that grant of this exemption would be in the public interest.

Current options for gathering the data which under this exemption would be collected using sUAS, include use of ladders, lifts, and manned aircraft. Use of ladders and lifts are inherently dangerous and result in numerous injuries each year. Use of manned aircraft is typically not feasible and therefore valuable information remains beyond the reach of the investigator. In most cases, use of a sUAS is quicker and easier than any other alternative and often yields better information.

Due to their small size and the fact they carry no fuel, all three models of the DJI Phantom pose a very low risk of damage to persons or structures on the ground. Because these sUAS are electric powered, they create no harmful emissions and make very little noise.

SUMMARY THAT CAN BE PUBLISHED IN THE FEDERAL REGISTER

H3DS requests the grant of an exemption to the following specific sections of the Title 14 Code of federal Regulations which would allow it to operate micro UAS for commercial use:

14 CFR 21, subpart H, 14 C.F.R Sections 61.3, 61.113(a)&(b), 61.133(a), 91.9 (b)(2), 91.103(b), 91.105, 91.109(a), 91.119, 91.121, 91.151(a), 91.203(a) &(b), 91.319(a)(1), 91.405, 91.407, 91.409, 91.417

CONCLUSIONS

H3DS respectfully requests that the FAA grant the exemption sought in this request. H3DS believes that considering the small size and weight of the sUAS, along with the sUAS PIC training and certification requirements stipulated above and the strict operating guidelines proposed herein, it is clearly demonstrated that the sUAS will be operated safely in the national air space (NAS) with an equivalent or greater level of safety compared to manned aircraft.

We are prepared to modify or amend any part of this request as deemed necessary by the FAA to satisfy the need for an equivalent level of safety. Please contact us at any time if you require additional information or clarification.

Respectfully Submitted,

HAAG 3D SOLUTIONS, LLC
A DIVISION OF HAAG ENGINEERING CO.



Kevin A. Kianka, PE
Director of BIM/Modeling Program

281-201-6727 DIR
856-986-5434 CELL
kkianka@haagglobal.com

Attachments:

H3DS Phantom Pre-Flight Checklist
Phantom_2_Vision_Plus_User_Manual_v1.8en
Phantom_2_Vision_Plus_Pilot_Training_Guide_v1.1_en
Phantom_2_Vision_Plus_Quick_Start_Guide_en

APPENDIX A: REGULATIONS REQUIRING EXEMPTION

H3DS requests an exemption from the following regulations as well as any additional regulations that may technically apply to the operation of the Phantom 3, Phantom 2 Vision+, and Phantom 2 sUAS:

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

Section 91.203 requires all civil aircraft to have a certificate of airworthiness. Part 21, Subpart H, entitled Airworthiness Certificates, establishes the procedural requirements for the issuance of airworthiness certificates as required by FAR § 91.203(a). Given the size of the sUAS, its light weight, and the limited operating area associated with its utilization, it is unnecessary to go through the certificate of airworthiness process under Part 21 Subpart H in order to achieve or exceed current safety levels.

Such an exemption meets the requirements of an equivalent level of safety under Part 11 and Section 333 of the Reform Act. The Federal Aviation Act and Section 333 of the Reform Act both authorize the FAA to exempt aircraft from the requirement for an airworthiness certificate, upon consideration of the size, weight, speed, operational capability, and proximity to airports and populated areas of the sUAS involved. An analysis of these different criteria demonstrates that the sUAS operated without an airworthiness certificate, under the conditions proposed in that exemption, will be at least as safe, or safer, than a conventional aircraft with an airworthiness certificate.

14 C.F.R. § 61.3: Requirements for certificates, ratings and authorizations

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

The regulation provides that no person may serve as a required pilot flight crewmember of a civil aircraft of the United States, unless that person:

(1) Has a pilot certificate or special purpose pilot authorization issued under this part in that person's physical possession or readily accessible in the aircraft when exercising the privileges of that pilot certificate or authorization. However, when the aircraft is operated within a foreign country, a pilot license issued by that country may be used.

The regulation provides also that no person that holds a private pilot certificate may act as pilot in command of an aircraft for compensation or hire. Subparagraph (b) allows a private pilot to act as pilot in command of an aircraft in connection with any business or employment if:

- (1) The flight is only incidental to that business or employment;
- (2) The aircraft does not carry passengers or property for compensation or hire.

Given the size, weight, speed, operational limitations, and range of the sUAS, H3DS proposes that operators of the UAS should not be required to hold a commercial pilot certification. Instead, operators should be required to:

Hold at least an FAA issued private, recreational, or sport pilot certificate. All operators will either meet the flight review requirements specified in 14 CFR § 61.56 or will annually complete and log at least 4 hours of ground instruction with a certified flight instructor (CFI) covering regulations and issues pertinent to commercial operation of the Phantom 3, Phantom 2 Vision+ and Phantom 2 UAS.

14 C.F.R. § 91.9: Civil aircraft flight manual, marking, and placard requirements.

This regulation provides that no person may operate an aircraft unless a current, approved flight manual is in the aircraft. H3DS proposes to provide an equivalent level of safety by maintaining a copy of all documents used by the operator to ensure the safe operation and flight of the UAS as well as documentation of an exemption and COA with the ground control station and accessible to the PIC during flight operations.

14 C.F.R. § 91.103: Preflight action

This regulation requires that each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight. This information must include runway lengths at airports of intended use, and the following takeoff and landing distance information.

This regulation is not applicable due to the fact H3DS sUAS operations will not occur at an airfield. To provide an equivalent level of safety, the PIC will complete a preflight inspection as directed by the manufacturer's manuals and H3DS UAS operations manual before any flight.

14 C.F.R. § 91.109(a) & 91.319(a)(1): Flight Instruction

The regulation provides that "No person may operate a civil aircraft that is being used for flight instruction unless that aircraft has fully functioning dual controls."

The equivalent level of safety will be achieved through H3DS's sUAS flight training program and conducting flight training within controlled environments.

14 C.F.R § 91.105: Flight Crewmembers at Stations

The regulation states that required crewmembers must be at their stations in the aircraft during specific portions of a flight.

This is not applicable since the sUAS carry no crewmembers. An equivalent level of safety will be maintained by ensuring that the PIC is identified prior to any flight and that the PIC does not change during a flight. The PIC will maintain control of the UAS for the duration of the flight.

14 CFR § 91.119: Minimum Safe Altitudes

The regulation provides that over sparsely populated areas the aircraft cannot be operated closer than 500 feet to any person, vessel, vehicle, or structure. Since the UA will be operating at a maximum of 500 feet AGL, these operations cannot comply with this requirement.

The equivalent level of safety will be achieved given the size, weight and speed of the sUAS. Additionally the sUAS will be operated in a defined and relatively small AOI. Moreover, the sUAS will not be operated over any open-air assembly of persons or over any person not involved with the operation. The aircraft will be operated at an altitude allowing, if a power unit fails, an emergency landing without undue hazard to persons or property on the surface.

14 CFR 91.121 – Altimeter settings

This section requires that each person operating an aircraft shall maintain the cruising altitude or flight level of that aircraft, as the case may be, by reference to an altimeter that is set, when operating below 18,000 feet MSL to:

- The current reported altimeter setting of a station along the route and within 100 nautical miles of the aircraft;
- If there is no station within the area prescribed in paragraph (a)(1)(i) of this section, the current reported altimeter setting of an appropriate available station;
- In the case of an aircraft not equipped with a radio, the elevation of the departure airport or an appropriate altimeter setting available before departure.

To provide an equivalent level of safety, the sUAS utilize a GPS system, barometric pressure sensors, and internal gyroscopes to calculate the altitude.

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

The regulation provides that no person may begin a flight in an airplane under day-VFR conditions unless there is enough fuel to fly to the first point of intended landing and to fly after that for at least 30 minutes.

Given the area of operation for the UAS, H3DS believes that an equivalent level of safety is achieved by requiring at least 75% battery power in order to begin a flight and requiring the UA to return to land when the battery power reaches 25%.

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

This regulation provides as follows:

- No person may operate a civil aircraft unless it has an appropriate and current

airworthiness certificate.

- 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.

To obtain an equivalent level of safety and meet the intent of 91.203, H3DS proposes to maintain a copy of all documents used by the operator to ensure the safe operation and flight of the sUAS as well as documentation of an exemption and COA with the ground control station and these will be available to the Administrator or any law enforcement official upon request.

14 CFR 91, Subpart E (91.405, 91.407, 91.409, 91.417) - Maintenance, Preventive Maintenance, and Alterations

The regulation provides that the operator is primarily responsible for maintaining the aircraft in an airworthy condition, including compliance with Parts 39 and 43. Paragraphs 91.407 and 91.409 require that the aircraft be "approved for return to service by a person authorized under 43.7" after maintenance and inspection. Section 91.409(a)(2) requires an annual inspection for the issuance of an airworthiness certificate. Section 91.417(a) requires the owner or operator to keep records showing certain maintenance work that has been accomplished by certificated mechanics, under Part 43, or licensed pilots and records of approval of the aircraft for return to service.

H3DS proposes that the maintenance, as well as preflight inspections of the sUAS will be accomplished by the PIC. All maintenance will be conducted and logged in accordance with the manufacturer's specifications. An equivalent level of safety will be achieved because the sUAS are small in size, are not complex mechanical devices, and will carry no external payload.