



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

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

May 7, 2015

Exemption No. 11110A
Regulatory Docket No. FAA-2014-0367

Mr. James A. Kirkland
Trimble Navigation Limited
935 Stewart Drive
Sunnyvale, CA 94085

Dear Mr. Kirkland:

This letter is to inform you that we have granted your petition to amend Exemption No. 11110. It explains the basis for our decision, describes its effect, and lists the revised conditions and limitations.

By letters dated March 4 and April 14, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Trimble Navigation Limited (hereinafter petitioner or operator) for an amendment to Exemption No. 11110. That exemption from §§ 61.113(a) and (b); 91.7(a); 91.119 (c); 91.151(a)(1); 91.405(a); 91.407(a)(1); 91.409(a)(1) and (2); and 91.417(a) and (b) of Title 14, Code of Federal Regulations (14 CFR) allows the petitioner to conduct precision aerial surveys that consist of still photographs taken by an onboard camera. You requested an amendment to add a new aircraft, the Trimble UX-5 hp, and to revise Condition nos. 4, 15, 16 (Pilot in Command), no. 19 (fuel requirements), no. 20 (Certificate of Waiver or Authorization (COA) requirements), and removing nos. #29 and #30 (operating parameters).

In your petition, you indicate that there has been no change in the conditions and reasons relative to public interest and safety that were the basis for granting the original exemption.

The FAA has determined that good cause exists for not publishing a summary of the petition in the Federal Register because the requested amendment to the exemption would not set a precedent, and any delay in acting on this petition would be detrimental to the petitioner. The unmanned aircraft(s) authorized in the original grant is comparable in type, size, weight, speed and operating capabilities to those in this petition.

Airworthiness Certification

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 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

The FAA has updated the conditions and limitations since the petitioner’s initial grant of exemption to those found in Exemption No. 11213 to Aeryon Labs, Inc. (Docket No. FAA-2014-0642). Also 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), 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 amendment to 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 an amendment is in the public interest.

Our Decision

The FAA has determined that the justification for the issuance of Exemption No. 11110 remains valid with respect to this exemption and is in the public interest. Therefore, under the authority contained in 49 U.S.C. 106(f), 40113, and 44701, delegated to me by the Administrator, Trimble Navigation Limited is granted an amendment to its exemption from 14 CFR §§ 61.23(a) and (c), 61.101(e)(4) and (5), 61.113(a), 61.315(a), 91.7(a), 91.119(c), 91.121, 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b), to the extent necessary to allow the petitioner to operate a UAS to perform aerial data collection. This exemption is subject to the conditions and limitations listed below.

Conditions and Limitations

The conditions and limitations within Grant of Exemption No. 11110 have been superseded, and are amended as follows.

In this grant of exemption, Trimble Navigation Limited 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 Trimble UX5 and Trimble UX5 hp 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 December 31, 2016, unless sooner superseded or rescinded.

Sincerely,

/s/

John S. Duncan

Director, Flight Standards Service



VIA EMAIL TRANSMISSION

April 14, 2015

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

Re: Application for Amendment to Exemption 11110 - Trimble Navigation, Ltd.
FAA Docket 2014-0367

Dear Sir or Madam:

On March 4, 2015 Trimble Navigation LTD (hereinafter "Trimble"), through its attorneys, submitted an application for an Amendment to Exemption 11110, originally issued December 10, 2014 in FAA Docket 2014-0367, to allow operation of an updated model of its UAS, the UX5hp. Given the recent changes in the terms of other exemptions issued by the FAA under Section 333 of the FAA Modernization and Reform Act of 2012, Trimble hereby files this supplemental amendment request to allow Trimble's UX5 and UX5hp to be operated under the same terms and conditions that the FAA has granted to other UAS operators under Section 333, as most recently reflected in Exemption 11240, Aerius Flight LLC, and Exemption 11257, Roger W. Meyer, PLS, which granted a Section 333 exemption involving a Trimble UX5 aircraft.

Specifically, Trimble requests that its Exemption 11110 be amended to not only allow it to operate its UX5hp aircraft as stated in the March 4, 2015 request, but that the following provision of its Exemption 11110 be removed or modified, as noted below, or, alternatively, the conditions in Exemption 11240 and Exemption 11257 be substituted in their entirety.

Specifically, Trimble requests that the following modifications be made to Exemption 11110:

- 1.) Amend Exemption 11110 condition #4 by adding language "...or U.S. driver's license" at the end of the second sentence. (See Exemption 11240.)
- 2.) Amend Exemption 11110 condition #15 by removing the present language and substituting the following: review requirements specified in 14 CFR § 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate." (See Exemption 11240.)
- 3.) Amend Exemption 11110 condition #16 by removing the present language and substituting the following:

April 14, 2015
Page Two

“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. The operator shall update its training manual as required under condition 6 of this exemption.” (See Exemption 11240, with addition of final sentence.)

- 4.) Amend Exemption 11110 condition #19 by reducing the stated time of remaining battery life from ten (10) minutes to five (5) minutes. (See Exemption 11240.)
- 5.) Amend Exemption 11110 condition #20 by substituting the following:

“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.”¹ (See Exemption 11240.)
- 6.) Amend Exemption 11110 by removing condition #29 as no longer needed. (See Exemption 11240.)
- 7.) Amend Exemption 11110 by removing condition #30 as no longer needed. (See Exemption 11240.)

To the extent necessary, Trimble refers the FAA to its original exemption request submitted in Docket FAA-2014-0367 for a listing of regulations (as amended by Exemption 11110) for which an exemption is being sought; a demonstration of the public interest; and a showing of an equivalent level of safety. Because the UX5hp is essentially the same aircraft as approved for commercial operations in Exemption 11110, and the conditions under which it will

¹ Trimble refers the FAA to its March 4, 2015 request for amendment to Exemption 11110 and its request for a COA allowing operations at 400 feet and below and the issuance of a COA allowing such operations. The UX5 and UX5hp software require operations at 400 feet AGL for survey operations.



April 14, 2015

Page Three

operate remain essentially the same as those included in Exemption 11110 and Exemptions 11240 and 11257, notice need not be provided in the Federal Register nor public comment solicited.²

If you have any questions, please contact us at your earliest convenience.

Sincerely yours,

A handwritten signature in black ink, appearing to read "J. B. Hill", with a long, sweeping horizontal line extending to the right.

Jonathan B. Hill
M. Anne Swanson
Counsel for Trimble Navigation, Ltd.

Encl.

cc: James Williams
Robert Pappas
Thuy Cooper
Dean Griffith, Esq.
James Kirkland
Kyle Gilbertson

²Applicant interprets Section 333 as placing a duty on the Administrator not only to process applications for exemptions under Section 333 but, if he determines that the conditions set forth herein do not fulfill the statutory requirements for approval, to craft conditions for the safe operation of the UAS.



M. Anne Swanson
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March 4, 2015

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

Re: Application for Amendment to Exemption 11110, Trimble Navigation Limited
FAA Docket 2014-0367

Dear Sir or Madam,

On December 10, 2014, the FAA issued Exemption 11110 to Trimble Navigation Limited ("Trimble"), allowing commercial operations of its UX5 aircraft under Section 333 of the FAA Modernization and Reform Act of 2012. Trimble now respectfully applies for an amendment to the Exemption to allow Trimble to operate an updated model of the UX5, named the "UX5 hp," under essentially the same conditions as approved in Exemption 11110.

The name and address of the applicant is:

Trimble Navigation Limited
935 Stewart Drive
Sunnyvale, California 94085-3919

Attn:
James A. Kirkland
Ph:408-481-8930
Fax:408-481-7780
Email:jim_kirkland@trimble.com

Trimble's new aircraft is the same aircraft described in Exemption 11110 except for a minimal weight increase and a power increase for the engine. The increased weight and power are necessitated by an increase in the payload (a larger camera) for the UX5 hp, which provides better resolution for the finished survey product. The power increase will allow operation of the aircraft up to a maximum gross take-off weight of 10 lbs. and will provide Trimble with the flexibility to adjust its payload in the future. Trimble requests that the amended exemption authorize operations of its aircraft weighing up to 10 lbs.

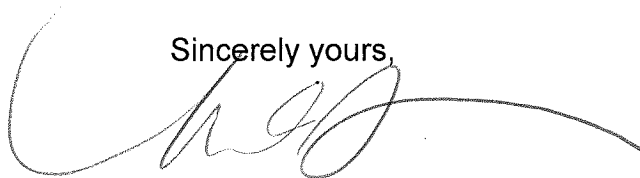
Set forth in Confidential Appendix A are the physical changes made to the UX5 to manufacture the UX5 hp. These limited changes do not affect the basis upon which the FAA granted its approval in Exemption 11110 and support the request for an amended exemption. Trimble asks that Confidential Appendix A not be made public as the information contained therein is not publically available; it contains commercially sensitive proprietary and trade secret information. As such, it is exempt from disclosure under the Freedom of Information Act, 5 USC Section 552(b)(4), and 14 C.F.R. Part 11.

Trimble requests that the amended exemption allow Trimble to operate the UX5 and the UX5 hp without a Certificate of Authorization (COA) in Class G airspace, at 400 feet AGL or below, and at least 5 nautical miles from the geographic center of an airport unless a letter of agreement with the airport's management is obtained. Trimble will file a NOTAM as specified in Exemption 11110 for any flight within this 5 nautical mile area. Trimble also requests that the amended exemption include a provision for obtaining access, by arrangement with the appropriate air traffic control authority, to airspace classes B, C, D, and E and altitudes above 400 feet but not exceeding 2500 feet AGL.

To the extent necessary, Trimble refers the FAA to its original exemption request submitted in Docket FAA-2014-0367 for a listing of regulations (as amended by Exemption 11110) for which a waiver is being sought; a demonstration of the public interest; and a showing of an equivalent level of safety. Because the UX5 hp is essentially the same aircraft as approved for commercial operations in Exemption 11110, and the conditions under which it will operate remain essentially the same, notice need not be provided in the Federal Register nor public comment solicited.¹

If you have any questions, please contact us at your earliest convenience.

Sincerely yours,



Jonathan B. Hill
M. Anne Swanson
Counsel for Trimble Navigation Limited

Enclosure

¹Applicant interprets Section 333 as placing a duty on the Administrator not only to process applications for exemptions under Section 333 but, if he determines that the conditions set forth herein do not fulfill the statutory requirements for approval, to craft conditions for the safe operation of the UAS.



Page 3

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