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

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

September 1, 2015

Exemption No. 12696
Regulatory Docket No. FAA−2015−2262

Mr. Richard Fisher
President
Precision Midwest, LTD
3 South 140 Barkley Avenue
Warrenville, IL 60555

Dear Mr. Fisher:

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

By letters dated May 26 and July 20, 2015 you petitioned the Federal Aviation Administration (FAA) on behalf of Precision Midwest, LTD (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial surveys and perform aerial data collection for agriculture and mining.

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 Trimble UX5 and Trimble UX5 HP.

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

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, Precision Midwest, LTD 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, Precision Midwest, LTD 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.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 September 30, 2017, unless sooner superseded or rescinded.

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

Enclosures

PRECISION MIDWEST

26 May 2015

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

Re: Application for Issuance of Section 333 Exemption Based upon Exemption 11110 Issued to Trimble Navigation Ltd.

Dear Sir or Madam,

Precision Midwest, Ltd, ("PMW") herewith applies for the issuance of an exemption under Section 333 of the FAA Modernization and Reform Act of 2012 based upon Exemption 11110 issued to Trimble Navigation Ltd. ("Trimble") on December 10, 2014 in FAA Docket 2014-0367. The requested exemption would allow PMW to operate the UX5 aircraft manufactured by Trimble or other Trimble aircraft approved for commercial operations under Exemption 11110, as amended, such as the UX5hp for which an amendment has been filed. PMW notes that the FAA recently authorized use of the Trimble UX5 by a third party in Exemption No. 11257, Regulatory Docket No. FAA–2014–0889, on April 2, 2015, under updated conditions, and PMW hereby confirms that it will accept such conditions as well as those set forth in Exemption No. 11240, Regulatory Docket No. FAA-2014-0894.

The name and contact information for the applicant are:

Richard Fisher, President
Precision Midwest, Ltd
3S 140 Barkley Avenue
Warrenville, Illinois 60555
Phone: (630) 836-1000
email: richard_fisher@precisionmidwest.com

PMW intends to operate the UX5 or the UX5hp from Trimble and will operate it in strict compliance with the conditions set forth in Exemption 11110, as such conditions may be amended or modified by the FAA from time to time, as was done in Exemption Nos. 11240 and 11257, or such other conditions as the FAA shall specify, and the following manuals:

1) Trimble UX5 Data Sheet; and
2) Trimble UX5 Aerial Imaging Solution User Guide (User Guide)

Copies of these manuals are attached.

These manuals are very similar to the manuals submitted by Trimble in support of the issuance of Exemption 11110, updated to reflect changes reported in Trimble's March 4, 2015 amendment to Exemption 11110. The manuals will be updated by

Trimble, as needed to reflect any changes to Exemption 11110, based on amendments thereto.

PMW acknowledges that under current FAA guidance a separate Certificate of Waiver or Authorization ("COA") is required to fly at altitudes in excess of 200 feet AGL, and it will apply for COAs where required. PMW hereby requests a blanket COA for flights up to 200 feet AGL in the form approved by the FAA. PMW will also file NOTAMs for its flights, as required.

To the extent necessary, PMW refers the FAA to the original exemption and the amended exemption requests submitted by Trimble in Docket FAA-2014-0367 for demonstration of the public interest and an equivalent level of safety. Because the UX5 and the UX5hp specified in this request are the same or, essentially the same, as the craft already approved in Exemption 11110, and PMW will operate the aircraft in strict compliance with the conditions in existing exemptions previously granted by the FAA, or as they may be amended, notice need not be provided in the Federal Register nor public comment solicited.[1]

If you have any questions, please contact the undersigned.

Very truly yours,

Richard Fisher, President
Precision Midwest, Ltd.
3S 140 Barkley Avenue
Warrenville, Illinois 60555

Enclosure

[1] Applicant reads Section 333 as placing the 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.

PRECISION MIDWEST

3S140 Barkley Avenue Warrenville, Illinois 60555
Phone (630) 836-1000 Fax (630) 836-8850

July 20, 2015

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

Re: **Existing Docket ID: FAA-2015-2262 Addendum**: Summary Processing: Exemption Request Under Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations Based Upon Exemption 11110A Issued to Trimble Navigation Limited

Dear Sir or Madam:

PRECISION MIDWEST, LTD ("Applicant") herewith applies for the issuance of an exemption under Section 333 of the FAA Modernization and Reform Act of 2012 ("Reform Act") based upon Exemption 11110 issued to Trimble Navigation Limited ("Trimble") on December 10, 2014, as amended on May 7, 2015 with issuance of Exemption 11110A in FAA Docket 2014-0367.

The requested exemption would allow Applicant to operate the Trimble UX5 and Trimble UX5 HP aircraft manufactured by Trimble Navigation, or other Trimble aircraft approved for commercial operations under Exemptions 11110 and 11110A, as they may be amended in the future. Applicant notes that, in granted Exemption 11666 dated May 22, 2015, the FAA authorized use of the Trimble UX5 by a third party company under conditions like those in Exemption 11110A.[1] Applicant hereby confirms that it will accept the conditions in Exemptions 11110A and 11666.

Applicant aircraft will be used to conduct aerial surveys and perform aerial data collection for agriculture, mining, and other purposes, but not for closed set filming (hereinafter "the Purpose"). Applicant hereby applies for an exemption from the listed Federal Aviation Regulations ("FARs") to allow commercial operation of its small unmanned aerial vehicles ("sUAVs"), so long as such operations are conducted within and under the conditions outlined herein or as may be established by the FAA in an exemption granted under either Section 333 or Section 49 U.S.C. §44701(f).

As this exemption request is identical to the already issued precedent, this request should qualify for summary processing as the FAA has already provided public notice of and granted similar exemptions. The FAA has issued exemptions in circumstances similar in all material respects to those presented in this petition. In numerous exemptions, the FAA has found that the enhanced safety achieved using an unmanned aircraft ("UA") with the specifications described by the petitioners and carrying no passengers or crew, when compared

[1] Exemption No. 11666 to AeroView Services LLC (see Docket No. FAA-2015-0630).

to flights of much larger manned aircraft that carry crew in addition to flammable fuel, gives the FAA good cause to find that the sUAV operation enabled by the exemptions serves the public interest.[2] In those cases, use of the proposed sUAV not only enhanced safety but also fulfilled the Secretary of Transportation's (the FAA Administrator's) responsibility to ". . . establish requirements for the safe operation of such aircraft systems in the national airspace system." Section 333(c) of the Reform Act.

The name and address of the applicant is:

Richard Fisher, President
3 S 140 Barkley Avenue
Warrenville, IL 60555
PH: (630) 836-1000 ext 231
email: richard_fisher@precisionmidwest.com

Regulations from which the exemption is requested:

14 C.F.R. 61.23(a) and (c)
14 C.F.R. 61.101(e)(4) and (5)
14.C.F.R. 61.113(a)
14 C.F.R. 61.315(a)
14 C.F.R. 91.7(a)
14 C.F.R. 91.119(c)
14 C.F.R. 91.121
14 C.F.R. 91.151(a)(1)
14 C.F.R. 91.405(a)
14 C.F.R. 91.407(a)(1)
14 C.F.R. 91.409(a)(1) and (2)
14 C.F.R. 91.417(a) and (b)

This exemption application is expressly submitted to fulfill Congress' goal in passing Sections 333(a) through (c) of the Reform Act. This law directs the Secretary of Transportation to consider whether certain unmanned aircraft systems may operate safely in the national airspace system (NAS) before completion of the rulemaking required under Section 332 of the Reform Act. In making this determination, the Secretary is required to determine which types of sUAVs do not create a hazard to users of the NAS or the public or pose a threat to national security in light of the following:

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

[2] 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).

Reform Act § 333(a). Lastly, 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." *Id.* § 333(c) (emphasis added).[3]

The Federal Aviation Act, in addition to the authority granted by Section 333 of Reform 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, from the requirement that all civil aircraft, which includes sUAVs, must have a current airworthiness certificate.[4]

The sUAVs that Applicant proposes to use are fixed wing Trimble UX5 and UX5 HP, each aircraft weigh less than 55 lbs, including payload. They operate, under normal conditions, at a speed of no more than 87 knots. They will operate at altitudes of no more than 400 feet above ground level, as further explained, and only within line of sight. They will operate as set forth in the confidential manuals attached hereto and made a part hereof (Exhibits 1 and 2).[5] Operations in compliance with these manuals will ensure that the sUAV will "not create a hazard to users of the national airspace system or the public"[6] and that the aircraft will operate in compliance with the conditions set forth in this application.

AIRCRAFT AND EQUIVALENT LEVEL OF SAFETY/NATIONAL SECURITY

The Applicant states that operating in compliance with the conditions set forth in Exemption 11666 and 11110A will provide an equivalent level of safety for the operation of the UX5 and UX5 HP. Approval of exemptions allowing commercial operations of sUAVs for aerial data collection will enhance safety by reducing risk. Conventional operations, using jet or piston power aircraft, operate at extremely low altitudes just feet from the subject being photographed and in extreme proximity to people and structures and present the risks associated with vehicles that weigh in the neighborhood of 6,000 lbs., carrying large amounts of jet A or other fuel (140 gallons for jet helicopters). Such aircraft must fly to and from the project location. In contrast, a sUAV weighing fewer than 55 lbs. and powered by batteries eliminates virtually all of that risk given the reduced mass and lack of combustible fuel carried on board. The sUAV is carried to the target area and not flown. The sUAV will carry no passengers or crew and, therefore, will

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

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

[5] Applicant has marked the manuals "CONFIDENTIAL" and separately submitted them. Applicant requests that these manuals be maintained in confidence and not be placed in the public docket or otherwise disclosed to the public. As the information contained in the manuals includes trade secrets and commercial information that is confidential and not made available to the public, it is exempt from disclosure under the Freedom of Information Act, 5. U.S.C. § 552(b) and 14 C.F.R. Part 11. Should the FAA receive a request for access to these manuals, Applicant requests notification of such request prior to any action being taken by the FAA, as it may relate to the request.

[6] Section 333(b) of the Reform Act.

not expose them to the risks associated with manned aircraft flights. These lightweight aircraft operate at slow speeds, close to the ground, and in areas that are under the control of the operator and, as a result, are far safer than conventional operations conducted with larger manned aircraft operating in close proximity to the ground and people.

Given the small size of the sUAVs involved and the restricted environment within which they will operate, Applicant falls squarely within that zone of safety (an equivalent level of safety) in which Congress envisioned that the FAA must, by exemption, allow commercial operations of sUAVs to commence immediately. Also, due to the size of the sUAVs, the restricted areas in which they will operate, and the fact that they will be flown by pilots holding at least an FAA sport or recreational pilot license, approval of the application presents no national security issue.

PUBLIC INTEREST

The FAA has granted exemptions to the regulations listed on page 2 in the exemptions cited above. As discussed in detail for each of these regulations in the attached Appendix A, the public interest will be served by an exemption because, with respect to each, operation in compliance with the requested conditions will ensure an equivalent level of safety. As also explained at length in Trimble's original Section 333 exemption request submitted on May 30, 2014, the grant of the requested exemption is in the public interest given the clear direction in Section 333 of the Reform Act; the authority included in the Federal Aviation Act, as amended; the strong equivalent level of safety surrounding the proposed operations; and the significant public benefit derived from, among other things, the enhanced safety and reduced environmental impact, including the reduced emissions associated with allowing battery powered sUAVs instead of turbine or gas powered aircraft.

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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:

Applicant seeks an exemption from the following rules:

14 C.F.R. §§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), 91.405(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b) to operate commercially a small unmanned vehicle (55 lbs. or less) in motion picture and television operations and aerial data collection.

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 – provide more than adequate justification for the grant of the requested exemption allowing commercial operation of applicant's sUAV for the Purpose outlined herein and are consistent with exemptions already granted, including Exemption 1110A. Accordingly, the applicant respectfully requests that the FAA grant the requested exemption without delay.

Very truly yours,

Richard Fisher- President

APPENDIX A

14 C.F.R. § 61.23(a) and (c): Medical Certificates: Requirement and Duration

Sections 61.23(a) and (c) address the requirement of medical certificates for pilots. Section 61.23(a) requires a person exercising the privileges of a recreational pilot to hold at least a third class medical certificate. Section 61.23(c) permits the holder of a sport pilot certificate to act as PIC of a light-sport aircraft with either a medical certificate or U.S. issued driver's license. Light-sport aircraft may weigh up to 1,430 pounds and seat up to two persons, including the pilot. Comparatively, the Trimble craft will weigh fewer than 55 pounds, and it will not carry pilots, passengers, or cargo. The UX5/UX5 HP sUAV will also be operated within visual line of sight of the PIC and below 400 feet above ground level and limited to operations with permission over private or controlled-access property.

Given these safety parameters, Applicant requests that the FAA waive Section 61.23(a) upon a finding that an equivalent level of safety will be provided by allowing operation of the Trimble craft by pilots with a recreational or sport pilot certificate and a valid U.S. state issued driver's license, in lieu of an FAA-issued medical certificate. Applicant also requests that the FAA grant relief from Section 61.23(c) to allow sport pilot certificate holders to operate aircraft other than light-sport aircraft with a valid U.S. issued driver's license. The FAA has granted exemptions to conduct similar operations in a number of cases, including Exemption 11213.

14 C.F.R. Part 61: Private Pilot Privileges and Limitations: Pilot in Command

Sections 61.113 (a) & (b) limit private pilots to non-commercial operations. Section 61.315(a) addresses the privileges and limitations of the holder of a sport pilot certificate.

Because the sUAV will not carry a pilot or passengers, the proposed operations can achieve the equivalent level of safety of current operations by requiring the PIC operating the aircraft to hold a certificate issued by the FAA authorizing operation of any aircraft (ATP, Commercial, Private, Recreational or Sport). Unlike a conventional aircraft that carries the pilot and passengers, the sUAV is remotely controlled with no living thing on board. The area of operation is controlled and restricted, and all flights are planned and coordinated in advance as set forth in the manual. The level of safety provided by the requirements included in the manuals exceeds that provided by a single individual holding a commercial pilot's certificate operating a conventional aircraft. The risks associated with the operation of the sUAV are so diminished from the level of risk associated with commercial operations contemplated by Part 61 when drafted, that allowing operations of the sUAV as requested with any certificate issued by the FAA as the PIC greatly exceeds the present level of safety achieved by 14 C.F.R. Part 61. The FAA has granted exemptions for private and sport or recreational pilots to conduct similar operations in Exemptions 11062, 11213, 11360 and 11666.

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

Section 91.119 establishes safe altitudes for operation of civil aircraft. Specifically, 91.119(c) limits aircraft flying over areas other than congested areas to an altitude of 500 feet above the surface, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure.

As set forth herein, the Trimble craft will never operate at higher than 400 feet AGL. They will, however, be operated to avoid congested or populated areas that are depicted in yellow on VFR sectional charts. Because aerial survey work must be accomplished at relatively low altitudes and at altitudes less than 400 feet AGL, an exemption from Section 91.119(c) is needed.

The equivalent level of safety will be achieved given the size, weight, speed, and material with which the Trimble craft are built. Also, no flight will be taken without the permission of the landowner or those who control the land. Because of the advance notice to the landowner, all affected individuals will be aware of the survey flights. Compared to aerial survey operations conducted with aircraft or rotorcraft weighing far more than the Trimble craft and carrying flammable fuel, any risk associated with these operations will be far less than those currently allowed with conventional aircraft operating at or below the same altitude. Indeed, the low-altitude operations of the sUAV will maintain separation between these sUAV operations and the operations of conventional aircraft that must comply with Section 91.119. The FAA has granted exemptions to conduct similar operations in Exemptions 11062, 11213, 11360 and 11447.

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

This regulation requires each person operating an aircraft to maintain cruising altitude by reference to an altimeter that is set "…to the elevation of the departure airport or an appropriate altimeter setting available before departure." As each sUAV model in at least one operating mode will not have a barometric altimeter, but instead a GPS altitude read out, an exemption will be needed. An equivalent level of safety will be achieved by the operator, pursuant to the manuals, confirming the altitude of the launch site shown on the GPS altitude indicator before flight. The FAA has granted exemptions to conduct similar operations in Exemptions 11062, 11213, 11360 and 11447.

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

Section 91.151 (a) prohibits an individual from beginning "a flight in an airplane under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing, and, assuming normal cruising speed – (1) During the day, to fly after that for at least 30 minutes; or (2) At night, to fly after that for at least 45 minutes."

The battery powering the sUAV limits the duration of a flight. To meet the 30-minute reserve requirement in 14 C.F.R. § 91.151, sUAV flights would be severely limited, in some cases to approximately 10 minutes in length. Given the limitations on the sUAV's proposed flight area and the location of its proposed operations within a predetermined area, a longer time frame for flight in daylight or night VFR conditions is reasonable.

Applicant believes that an exemption from 14 C.F.R. § 91.151(a) falls within the scope of prior exemptions. *See* Exemption 10673 (allowing Lockheed Martin Corporation to operate without compliance with FAR 91.151 (a)). Operating the sUAV, in a tightly controlled area where only people and property owners or official representatives who have signed waivers will be allowed, with less than 30 minutes of reserve fuel, does not engender the type of risks that Section 91.151(a) was intended to alleviate given the size and speed of the sUAV.

Applicant believes that an equivalent level of safety can be achieved by limiting flights to five minutes of reserve time on the batteries. This restriction would be more than adequate to return the sUAV to its planned landing zone from anywhere in its limited operating area. Similar exemptions have been granted to other operations in Exemptions 2689F, 5745, 10673, 10808 and Exemptions 11062, 11213, 11360, 11447 and 11666.

14 C.F.R. Part 91: Maintenance Inspections

Section 91.405(a) requires that an aircraft operator or owner "shall have that aircraft inspected as prescribed in subpart E of this part and shall between required inspections, except as provided in paragraph (c) of this section, have discrepancies repaired as prescribed in part 43 of this chapter . . . ." Section 91.407 similarly makes reference to requirements in Part 43; Section 91.409(a)(2) requires an annual inspection for the issuance of an 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.

Given that these sections and Part 43 apply only to aircraft with an airworthiness certificate, these sections will not apply to the applicant. Maintenance will be accomplished by the operator pursuant to the manuals. An equivalent level of safety will be achieved because these sUAVs are very limited in size and will carry a small payload and operate only in areas for limited periods of time. If mechanical issues arise, the sUAV can land immediately since it will be operating from no higher than 400 feet AGL. As provided in the manuals, the operator will ensure that the sUAV is in working order prior to initiating flight, perform required maintenance, and keep a log of any maintenance performed. Moreover, the operator is the person most familiar with the aircraft and best suited to maintain the aircraft in an airworthy condition in order to provide the equivalent level of safety. The FAA has granted exemptions for similar operations in Exemptions 11062, 11213, 11360, 11447 and 11666.

Exhibit 1

Precision Midwest UAS Field Operations Protocol

Precision Midwest's ("PMW") field sUAS operational procedures and conduct are listed below in order to meet the goal of operating at the highest safety levels:

1. Field operations will be comprised of a 2-person UAS team, the Pilot-In-Command, and forward observer who will act as a field safety technician.

2. PMW staff will refrain from using, or operating, mobile phones and other distraction devices during pre-flight, in-flight, and post-flight aircraft checks until the aircraft is recovered and deemed "disarmed" for the auto-pilot system. The only exception would be if there is an emergency in the field during flight that would require the immediate use of mobile phones, as required by the situation.

3. When possible, all mission planning will be done before the UAS crew arrives on site, in addition, potential site obstructions will be researched to prevent any in-air collisions with other tall objects, ie towers, stacks, etc. A project site COA document will be confirmed and the flight crew will have a hardcopy of this document in the field for visual inspection, if requested.

4. As part of pre-flight, the PMW field crew will fully inspect all UAS equipment items, including aircraft, batteries, controller and communication link device to ensure all items are in good working order without any damage or missing parts that could pose a potential in-flight safety issue. Items found to be damaged will be marked accordingly for replacement or repair and a backup item will be used accordingly.

5. Additionally, as part of pre-flight the site to be aerial mapped will be checked visually to confirm no new obstacles have been placed that would potentially pose a safety risk for the planned take-off and landing zone areas. Both the landing zone and take-off areas will be physically marked in person use the included GPS-enabled tablet controller to confirm and mark locations for safe UAS take-off and landing. A secondary landing-zone, or backup, will be also marked in a separate area before UAS launch to offer an emergency backup landing location if the primary landing zone is deemed unsafe during flight and the P.I.C. can switch to the backup landing location.

6. A simulated flight will be performed in the field as part of pre-flight in order to confirm the proper flight line entry and flight path of the sUAV will not interfere with any avoidance zones entered into the flight planning software. The P.I.C. will confirm the landing zone glide paths for both landing zones are clear and meet minimum clearance recommendations by Trimble for width, length and obstacle clearance height in the glide path.

7. The Trimble Access Aerial Imaging field controller software includes a complete step-by-step preflight checklist which will be read aloud by the P.I.C. and performed by the field observer, and confirmed by the P.I.C. before proceeding to the next step.
    a. Please refer to attached PDF "**Aerial Imaging User Guide Ver2.0**", Chapters 3 and 4, which detail the steps followed for equipment safety checks and pre and post-flight detailed checklists.

8. During flight, the P.I.C. will use the tablet controller to observe aircraft progress, communication and power status and be aware of any potential objects that enter the

flight block area. A 2-way radio may be in use to communicate with the forward observer, as needed, or with local ATC, or local airspace in order to communicate as needed with other pilots in the area to ensure safety for everyone.

9. The forward observer will visually track the sUAV from take-off to landing and inform the P.I.C. of any safety concerns or flight plan deviations they observe. If deemed necessary the P.I.C. has ability to divert the sUAV in-flight to alternate locations to hold, climb, or descend to ensure clearance and safety. In an emergency situation the P.I.C. has the ability to abort the flight and the sUAV will immediately spiral down to the ground to clear the airspace quickly.

10. As part of post-flight both P.I.C. and forward observer will first visually inspect the sUAV and confirm it has been successfully "disarmed" by the P.I.C. before removing it from the landing zone to ensure the autopilot and electric motor have been fully disengaged.

11. Trimble Access Aerial Imaging field software on the control tablet also includes a post-flight routine checklist to download all flight logs, aerial images and remove power supply from the aircraft completely. Both P.I.C. and forward observer will jointly complete the post-flight routine and verbally confirm each step.

12. Items that have have been damaged during the landing will be documented, removed and replaced, or serviced, before the next flight will occur.

13. A sUAV log book will be part of the PMW kit for flight log tracking, service tracking and record the P.I.C. and forward observer for each flight.

14. The manufacturer guidelines for replacing the complete sUAV body, or wing, will be adhered to, which is typically after 100-200 landings for the UX5 and UX5 HP wing bodies. The eBox will be transferred to the new wing, and pre-flight testing will confirm full and proper functionality of the new wing prior to launch.

15. At least annually, PMW UAS flight crew personnel will go through recursive safety and software training to ensure crews understand new software workflows and proper safety procedures are followed at all times.

All Pilot-In-Command PMW staff will hold a FAA Sport's pilot, or Private Pilot, license as well as will have successfully completed the four (4) day Trimble Certified UX5 Remote Operator Pilot training program.

Exhibit 2:

Please refer to attached PDF "**UX5 Maintenance Guide Feb 2015**" which details how to properly service and replace parts of the UX5 and UX5 HP which are needed

Exhibit 3:

Please refer to attached PDF " **Aerial Imaging User Guide Ver2.0"** which details how to properly setup and execute a safe and proper aerial flight mission. Sample screen shots and equipment pictures are included as visual references for the P.I.C. and forward observer staff to ensure they clearly understand how to carry out the instructions, as directed by the manufacturer.

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