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

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

September 15, 2015

Exemption No. 12853
Regulatory Docket No. FAA−2015−2666

Mr. Michael C. Lindberg
Attorney for Mosher Thomas L.L.C.
780 Northland Plaza
3800 American Boulevard West
Minneapolis, MN 55431−4459

Dear Mr. Lindberg:

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 June 5, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of Mosher Thomas L.L.C. (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial surveying, search and rescue, new construction management, land management, surveillance, and aerial photography.

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 Blade 350 QX and Walkeria Tali H500.

The petitioner requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*. In accordance with the statutory criteria

provided in Section 333 of Public Law 112−95 in reference to 49 U.S.C. § 44704, and in consideration of the size, weight, speed, and limited operating area associated with the aircraft and its operation, the Secretary of Transportation has determined that this aircraft meets the conditions of Section 333. Therefore, the FAA finds that the requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*, and any associated noise certification and testing requirements of part 36, is not necessary.

The Basis for Our Decision

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

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

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

Our Decision

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. 106(f), 40113, and 44701, delegated to me by the Administrator, Mosher Thomas L.L.C. 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, Mosher Thomas L.L.C. 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 Blade 350 QX and Walkeria Tali H500 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

United States of America

Department of Transportation

Federal Aviation Administration

Washington, D.C.

Regulatory Docket No. _____

PETITION FOR THE EXEMPTION OF:

MOSHER THOMAS L.L.C.

FROM THE REQUIREMENTS OF 14 C.F.R. Part 21, §§43.3, 43.5, 91.107, 91.9, 91.119, 91.151, 91.203 (a) and (b), 91.405, 91.407, and 91.409, CONCERNING OPERATIONS OF UNMANNED AIRCRAFT SYSTEMS OVER THE UNITED STATES OF AMERICA, PURSUANT TO SECTION 333 OF THE FAA MODERNIZATION AND REFORM ACT OF 2012

Submitted June 5, 2015

JOHNSON & LINDBERG, P.A.

Michael C. Lindberg
Attorney for Mosher Thomas L.L.C.
780 Northland Plaza
3800 American Boulevard West
Minneapolis, MN 55431-4459
(952) 851- 0700
Direct: (952) 956-6200
mlindberg@johnsonlindberg.com

Table of Contents

Abbreviations

ADM	Aeronautical Decision Making
AGL	Above Ground Level
ATC	Air Traffic Control
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
GCS	Ground Control Station
GHz	Gigahertz
LZ	Landing Zone
MTI	Mosher Thomas Industries L.L.C
NAS	National Airspace System
NM	Nautical Mile
PIC	Pilot In Command
POH	Pilots Operating Handbook
RAIM	Receiver Autonomous Integrity Monitoring
§333	FAA Modernization and Reform Act of 2012, Section 333
SIC	Second In Command
SMS	Safety Management System
SOG	Standard Operating Guidelines
UAS	Unmanned Aircraft System
UA	Unmanned Aircraft
UAV	Unmanned Aircraft Vehicle
VFR	Visual Flight Rules
VLOS	Visual Line Of Sight
VMC	Visual Meteorological Condition
VO	Visual Observer

SUMMARY

Mosher Thomas Industries L.L.C. seeks exemption from the requirements of §14 C.F.R. Part 21 and 14 C.F.R. §43.3, §43.5, §61.113(a) & (b), §61.133(a), §91.9(b)(2), §91.119 , §91.151(a), §91.203(a) & (b), §91.405(a),§91.407(a)(1), §91.409(a)(2), and §91.417(a). This exemption will permit Mosher Thomas Industries L.L.C (MTI) to operate Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS) while keeping any required documents by regulation at the ground control station (GCS) and within immediate accessibility of the pilot in command (PIC). In addition, this exemption will also permit MTI L.L.C. to operate UAS with the required aircraft markings as large as possible. Furthermore, this exemption will permit MTI L.L.C. to operate UAS without airworthiness certificates for its UAS.

INTRODUCTION AND INTERESTS OF THE PETITIONER

Mosher Thomas Industries L.L.C. (hereinafter **MTI**) is a company established by three pilots. One pilot was a Lieutenant Colonel in the Air Force Reserve in Duluth, Minnesota. With a career in the military for over 20 years, he flew F-16s, T-38s, MQ-1s, MQ-9s and served as a military instructor. He has logged many hours as PIC in the military for UAS and has worked as an instructor at the University of North Dakota in its UAS program. He is currently employed at Northrop Grumman as a test pilot in a UAS project. The other two pilots are graduates of Lake Superior College in the professional helicopter program, where they received training on the procedures of UAS launch and recovery, data uplink and downlink, rules and regulations and aeronautical decision making. All three pilots hold a current Class Two medical certificates granted by a FAA medical examiner.

MTI intends to use UAS in the NAS with a well-formulated and strictly-enforced set of guidelines and protocols in making the integration of UAS in the NAS as safe as, if not safer than, current manned aircraft. As set forth in this petition, MTI seeks to operate its Blade 350 QX and Walkeria Tali H500 for purposes of aerial surveying, search and rescue, new construction management, land management, surveillance, and aerial photography.

EQUIPMENT AND AIRCRAFT

Unmanned Aircraft System: Blade 350 QX

MTI seeks exemption to operate a Blade 350 QX UAS for compensation or hire within the NAS. The Blade 350 QX, pictured below at Figure 1, is a VTOL (vertical takeoff and landing) UAS with skid type landing gear. It is powered by a lithium polymer battery that runs four electric Multistar brushless motors that are capable of producing flight for a total of approximately 15 minutes. The Blade 350 QX weighs less than 4 pounds with the camera and gimbal attached. It has dimensions of 18.3 inches by 18.3 inches by 5.43 inches. It is operated by a Spektrum DX5e transmitter, pictured below at figure 2, that transmits on the 2.4 GHz bandwidth.

Figure 1: The Blade 350 QX

Figure 2: The DX5e Transmitter

The Blade 350 QX is capable of flying in three different modes:

- *Smart Mode (Green Mode)* - This mode provides a position hold when control inputs are at a neutral position, utilizing a self-leveling feature which brings the Blade 350 QX to a level attitude. The altitude is relative to throttle position. In this mode, it is considered to be a "tethered UAV," meaning that when the operator pushes the control stick away from him/her, the Blade 350 QX will move away from the operator regardless of the direction the front is facing.
- *Stability Mode (Blue Mode)* – This mode is similar to Smart Mode, but instead of moving as if it were "tethered", the Blade 350 QX will follow control inputs based on the orientation of the UAV. In this mode it has all of the functions that Smart Mode offers.
- *Agility Mode (Red Mode)* – This mode is will never be used in any circumstance and to ensure this, the transmitter is programmed to only operate in Smart mode and Stability Mode.

Lost Link Facts and Procedures

The Blade 350 QX has flashing light sequences and series of beeps to indicate lost link from transmitter and GPS signal lost. If the Blade 350 QX loses GPS signal during flight, it will default to "Stability Mode" and still will allow the operator to continue to operate the UAV. The Blade 350 QX has a safety feature built into the software that utilizes a GPS signal to automatically land if the UAV loses transmitter signal. Upon losing a transmitter signal, the Blade 350 QX will do one of five options. If the motors are not turning, the 350 QX will disarm. When the motors are turning but the Blade 350 QX is not flying, it will turn of the motors and disarm. If the Blade 350 QX is flying and has a good GPS lock with a home position set, it will activate the "Return Home" function upon the loss of the transmitter signal. "Return Home" is set prior to flight and is the location where the Blade 350 QX takes off from. If the compass is not connected or faulty, or if there is no GPS lock, the Blade 350 QX will descend slowly upon the loss of transmission signal. If the pressure sensor is not working, the Blade 350 QX will reduce power to initialize a controlled descent upon the loss of transmission signal. MTI will ensure that GPS signal will be available based off of location and time by doing a RAIM (Receiver Autonomous Integrity Monitoring) check before every flight at the location and time of proposed flight. MTI has done its own research into lost link procedures and capabilities of the Blade 350 QX. MTI will ensure before every flight, that should a lost link between the Blade 350 QX and the transmitter happen and when a lost link procedure is initiated, that it will do harm to people or property on its way back the LZ (Landing Zone). MTI will never fly indoors and under dense vegetation. To ensure that the Blade 350 QX will not have a faulty internal compass, MTI will recalibrate the compass as stated in the manufacturer manual.

Proven Operation History of the Blade 350 QX

MTI has operated the Blade 350 QX at a test site in Northern Minnesota underneath 400 AGL, not within 5 NM of any airport or runway, and not in a populated area. MTI has flown over 50 hours on the DX5e transmitter and Blade 350 QX with more than 250 battery cycles on two 2200 mah and two 3000 mah lithium polymer batteries. MTI has been accident free with the Blade 350 QX from October 10, 2014 to the present in all practice phases of flight.

Unmanned Aircraft System: Tali H500

The Tali H500 operation is substantially similar to that of the Blade 350 QX. MTI will fully comply with the manufacturer's operations manual. It is pictured below at Figure 3. The Devo F12E transmitter is pictured below at Figure 4.

Figure 3: The Tali H500

Figure 4: The Devo F12E Transmitter

BASIS FOR PETITION

Pursuant to the provisions of the Federal Aviation Regulations (14 C.F.R. §11.61) and the FAA Modernization and Reform Act of 2012, Section 333, *Special Rules for Certain Unmanned Aircraft Systems*, Petitioner Mosher Thomas Industries L.L.C. hereby petitions the Administrator for an exemption from the requirements of §14 C.F.R. Part 21 and 14 C.F.R. §43.3, §43.5, §61.113(a) & (b), §61.133(a), §91.9(b)(2), §91.119, §91.151(a), §91.203(a) & (b), §91.405(a), §91.407(a)(1), §91.409(a)(2), and §91.417(a). In accordance with 14 C.F.R. §11.81, MTI provides the following information in support of its petition for exemption:

A. Name and Address of Petitioner

Mosher Thomas Industries L.L.C.
115 Summer Street South
Pierz, Minnesota 56364

The point of contact is:
Mackenzie A. Thomas
115 Summer Street South
Pierz, Minnesota 56364
Tel: 320-237-4522
Email: mathomas6976@hotmail.com

B. Federal Aviation Regulations From Which MTI Seeks Exemption

1. MTI Seeks Exemption from the Requirements Of Part 21 for the Blade 350QX and Tali H500

In accordance with Section 333 of the FAA Modernization Act of 2012 and 14 C.F.R. §21.16, *Special Conditions*, MTI seeks to exempt the Blade 350 QX and Tali H500 UAS from the restricted category airworthiness certification specified in 14 C.F.R. §21.185, or the requirement to have a certificate of airworthiness issued, as contemplated by 14 C.F.R. part 21. Section 21.185, entitled *Issue of airworthiness certificates for restricted category aircraft*, states the following in part:

> (a) Aircraft manufactured under a production certificate or type certificate. An applicant for the original issue of a restricted category airworthiness certificate for an aircraft type certificated in the restricted category, that was not previously type certificated in any other category, must comply with the appropriate provisions of § 21.183.

Extent and Reason Relief is Sought: MTI requests to be exempt from the airworthiness certificate requirement for the Blade 350 QX and the Tali H500 because the FAA has not yet type certificated either UAS. MTI proposes that for the purpose of conducting commercial operations, there will be a Safety Management System (SMS) in place and specific Standard Operating Guidelines (SOGs).

2. **MTI Seeks Exemption From The Requirements Of §43.3, *Persons Authorized to Perform Maintenance, Preventive Maintenance, Rebuilding, and Alterations.*** Subsection (b) states:

> (b) The holder of a mechanic certificate may perform maintenance, preventive maintenance, and alterations as provided in Part 65 of this chapter.

Extent and Reason Relief is Sought: Relief is requested because there are no FAA certified mechanics to do maintenance on the Blade 350 QX or Tali H500. MTI has a Chief Technical Officer who does all in-house maintenance. The Chief Technical Officer is a rated Private Pilot. Therefore MTI proposes that the Chief Technical Officer will be the individual that will sign the Blade 350 QX and Tali H500 for a return to service.

3. **MTI Seeks Exemption From The Requirements Of §43.5, *Approval For Return To Service After Maintenance, Preventative Maintenance, Rebuilding, Or Alteration.*** Section 43.5 states:

> No person may approve for return to service any aircraft, airframe, aircraft engine, propeller, or appliance, that has undergone maintenance, preventive maintenance, rebuilding, or alteration unless—
> (a) The maintenance record entry required by §43.9 or §43.11, as appropriate, has been made;
> (b) The repair or alteration form authorized by or furnished by the Administrator has been executed in a manner prescribed by the Administrator; and
> (c) If a repair or an alteration results in any change in the aircraft operating limitations or flight data contained in the approved aircraft flight manual, those operating limitations or flight data are appropriately revised and set forth as prescribed in §91.9 of this chapter.

Extent and Reason Relief is Sought: Relief is requested because MTI has a Chief Technical Officer who signs off each UAS after maintenance as airworthy before it is returned to service. MTI utilizes log books for the Blade 350 QX and the Tali H500. All maintenance logs books will be dated, describe the maintenance performed, and be signed by the Chief Technical Officer. MTI proposes that all maintenance log books will be kept in the GSC, where the PIC will have access to them.

4. **MTI Seeks Exemption From The Requirements Of §91.107, *Use Of Safety Belts, Shoulder Harnesses, And Child Restraint Systems.*** Section 91.107 states:

> (a) Unless otherwise authorized by the Administrator—
> (1) No pilot may take off a U.S.-registered civil aircraft… unless the pilot in command of that aircraft ensures that each person on board is

briefed on how to fasten and unfasten that person's safety belt and, if installed, shoulder harness.

(2) No pilot may cause to be moved on the surface, take off, or land a U.S.- registered civil aircraft… unless the pilot in command of that aircraft ensures that each person on board has been notified to fasten his or her safety belt and, if installed, his or her shoulder harness.

Extent and Reason Relief is Sought: MTI seeks full relief from requirement of §91.107 because there is no pilot or other person on board the Blade 350 QX or Tali H500, so there is no need for any crewmember or person to wear a seatbelt or shoulder harness.

5. **MTI Seeks Exemption From The Requirements Of §91.9, *Civil Aircraft Flight Manual, Marking, And Placard Requirements.*** Section 91.9 states:

(a) Except as provided in paragraph (d) of this section, no person may operate a civil aircraft without complying with the operating limitations specified in the approved Airplane or Rotorcraft Flight Manual, markings, and placards, or as otherwise prescribed by the certificating authority of the country of registry.

(b) No person may operate a U.S.-registered civil aircraft—

(1) For which an Airplane or Rotorcraft Flight Manual is required by §21.5 of this chapter unless there is available in the aircraft a current, approved Airplane or Rotorcraft Flight Manual or the manual provided for in §121.141(b); and

(2) For which an Airplane or Rotorcraft Flight Manual is not required by §21.5 of this chapter, unless there is available in the aircraft a current approved Airplane or Rotorcraft Flight Manual, approved manual material, markings, and placards, or any combination thereof.

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

Extent and Reason Relief is Sought: MTI seeks relief from section 91.9 because the Blade 350 QX and the Tali H500 weigh under ten pounds and cannot carry the approved Airplane Flight Manual onboard. Since the Blade 350 QX and Tali H500 are unmanned aircraft, MTI proposes the following conditions and limitations to its request for exemption from section 91.9:

The Flight Manual for each UAS will be in reach of the PIC at the GCS during all flights, where it will readily available for reference by the PIC or any aircrew or ground crew member.

6. **MTI Seeks Exemption From The Requirements of §91.119, *Minimum Safe Altitudes: General.*** Section 91.119 states:

Except when necessary for takeoff or landing, no person may operate an aircraft below the following altitudes:

(a) Anywhere. An altitude allowing, if a power unit fails, an emergency landing without undue hazard to persons or property on the surface.
(b) Over congested areas. Over any congested area of a city, town, or settlement, or over any open air assembly of persons, an altitude of 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft.
(c) Over other than congested areas. 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.

Extent and Reason Relief is Sought: Full relief is requested because MTI cannot fly at least 500 feet AGL, or 1000 feet above the highest obstacle within 2000 feet horizontally due to the FAA restrictions on UAS, limiting flight above 400 feet AGL.

7. **MTI Seeks Exemption From The Requirements Of §91.151, *Fuel Requirements For Flight In VFR Conditions.*** Section 91.151 states:

(a) No person may begin a flight in an airplane under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing and, assuming normal cruising speed—
(1) During the day, to fly after that for at least 30 minutes; or
(2) At night, to fly after that for at least 45 minutes.
(b) No person may begin a flight in a rotorcraft 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, to fly after that for at least 20 minutes.

Extent and Reason Relief is Sought: MTI seeks full relief because the Blade 350 QX and the Tali H500 do not use fuel to operate. Since they operate with battery power, MTI proposes the following limitations and conditions to its request for exemption from Section 91.151:

MTI will land immediately at the designated LZ when the battery power reaches 25%.

8. **MTI Seeks Exemption From The Requirements Of §91.203 (a) and (b), *Civil Aircraft: Certifications Required.*** Section 91.203 states:

(a) Except as provided in §91.715, no person may operate a civil aircraft unless it has within it the following:
(1) An appropriate and current airworthiness certificate. Each U.S. airworthiness certificate used to comply with this subparagraph (except a special flight permit, a copy of the applicable operations specifications issued under §21.197(c) of this chapter, appropriate sections of the air carrier manual required by parts 121 and 135 of this chapter containing

that portion of the operations specifications issued under §21.197(c), or an authorization under §91.611) must have on it the registration number assigned to the aircraft under part 47 of this chapter. However, the airworthiness certificate need not have on it an assigned special identification number before 10 days after that number is first affixed to the aircraft. A revised airworthiness certificate having on it an assigned special identification number, that has been affixed to an aircraft, may only be obtained upon application to an FAA Flight Standards district office.

(2) An effective U.S. registration certificate issued to its owner or, for operation within the United States, the second copy of the Aircraft registration Application as provided for in §47.31(c), or a registration certification issued under the laws of a foreign country.

(b) No person may operate a civil aircraft unless the airworthiness certificate required by paragraph (a) of this section or a special flight authorization issued under §91.715 is displayed at the cabin or cockpit entrance so that it is legible to passengers or crew.

Extent and Reason Relief is Sought: MTI requests full exemption from 91.203 (a) and (b) because the Blade 350 QX and Tali H500 fully loaded weigh no more than 55 lbs and are operated without an onboard pilot. As such, there is no ability or place to carry certification and registration documents or to display them on the UAS. An equivalent level of safety will be achieved by keeping these documents at the ground control point where the pilot flying the UAS will have immediate access to them.

9. **MTI Seeks Exemption From The Requirements Of §91.405, *Maintenance Required.*** Section 91.405 states:

Each owner or operator of an aircraft—

(a) 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;

(b) Shall ensure that maintenance personnel make appropriate entries in the aircraft maintenance records indicating the aircraft has been approved for return to service;

(c) Shall have any inoperative instrument or item of equipment, permitted to be inoperative by §91.213(d)(2) of this part, repaired, replaced, removed, inspected at the next required inspection; and

(d) When listed discrepancies include inoperative instruments or equipment, shall ensure that a placard has been installed as required by §43.11 of this chapter.

Extent and Reason Relief is Sought: MTI seeks relief from §91.405, §91.407, and §91.409 because there are no FAA certified mechanics to do inspections on the Blade 350 QX and Tali H500. MTI proposes that the Chief Technical Officer will do all maintenance on the Blade 350 QX and Tali H500 in accordance with

the manufacturer's manual. The Chief Technical Officer holds a private pilot's license and is one of the owners/operators. MTI will maintain maintenance log books and will due a full inspection every 50 hours of operation on the UASs.

10. **MTI Seeks Exemption From The Requirements Of §91.407*, Operation After Maintenance, Preventative Maintenance, Rebuilding, Or Alteration.*** Section 91.407 states:

    (a) No person may operate any aircraft that has undergone maintenance, preventive maintenance, rebuilding, or alteration unless—

    (1) It has been approved for return to service by a person authorized under §43.7 of this chapter; and

    (2) The maintenance record entry required by §43.9 or §43.11, as applicable, of this chapter has been made.

    (b) No person may carry any person (other than crewmembers) in an aircraft that has been maintained, rebuilt, or altered in a manner that may have appreciably changed its flight characteristics or substantially affected its operation in flight until an appropriately rated pilot with at least a private pilot certificate flies the aircraft, makes an operational check of the maintenance performed or alteration made, and logs the flight in the aircraft records.

    (c) The aircraft does not have to be flown as required by paragraph (b) of this section if, prior to flight, ground tests, inspection, or both show conclusively that the maintenance, preventive maintenance, rebuilding, or alteration has not appreciably changed the flight characteristics or substantially affected the flight operation of the aircraft.

Extent and Reason Relief is Sought: See description in paragraph 9, above.

11. **MTI Seeks Exemption From The Requirements of Section §91.409 (a) and (b), *Inspections*.** Section 91.409 (a) and (b) state:

    (a) Except as provided in paragraph (c) of this section, no person may operate an aircraft unless, within the preceding 12 calendar months, it has had—

    (1) An annual inspection in accordance with part 43 of this chapter and has been approved for return to service by a person authorized by §43.7 of this chapter; or

    (2) An inspection for the issuance of an airworthiness certificate in accordance with part 21 of this chapter. No inspection performed under paragraph (b) of this section may be substituted for any inspection required by this paragraph unless it is performed by a person authorized to perform annual inspections and is entered as an ‘‘annual’’ inspection in the required maintenance records.

(b) Except as provided in paragraph (c) of this section, no person may operate an aircraft carrying any person (other than a crewmember) for hire, and no person may give flight instruction for hire in an aircraft which that person provides, unless within the preceding 100 hours of time in service the aircraft has received an annual or 100- hour inspection and been approved for return to service in accordance with part 43 of this chapter or has received an inspection for the issuance of an airworthiness certificate in accordance with part 21 of this chapter. The 100- hour limitation may be exceeded by not more than 10 hours while en route to reach a place where the inspection can be done. The excess time used to reach a place where the inspection can be done must be included in computing the next 100 hours of time in service.

Extent and Reason Relief is Sought: See description in paragraph 9, above.

C. The Reasons Why Granting MTI's Request Would Be In The Public Interest; That Is, How It Would Benefit The Public As A Whole.

Low-altitude UAS flights take the place of inherently more hazardous manned operations to do aerial photography, search and rescue, crop management, surveillance and land management, thus producing a net safety benefit. MTI is capable of producing a level of safety that is equal to, or safer than, manned aircraft. With no fuel on board and weighing less than ten pounds, there is less physical potential for collateral damage to life and property on the ground and in the air than a manned aircraft. The Blade 350 QX and the Tali H500 UASs are battery powered, which is more safe, more economical, and more efficient than current manned aircraft that use combustible fuels. This will help reduce levels of air and noise pollution compared to having a manned aircraft conduct the same missions. An exemption allowing MTI to use the UASs in the NAS will be a step in the direction of greatly reducing air traffic and congestion at airports, since the Blade 350 QX and Tali H500 do not need to take-off or land at an airport.

MTI's use of UASs in the NAS would contribute to economic growth of the United States by filling the increasing need for aerial inspection and photography. Approval of UASs will allow for new companies to emerge and create competition in the market, which will ultimately make services less expensive for the public.

D. The Reasons Why Granting The Exemption Would Not Adversely Affect Safety, Or How The Exemption Would Provide A Level Of Safety At Least Equal To That Provided By The Rule From Which You Seek The Exemption.

The UASs will be operated by licensed pilots in strict compliance with the terms of the conditions and limitations imposed by the FAA, the Federal Aviation Regulations, the manufacturers' manuals, and the applicant's Safety Management System (SMS) and specific Standard Operating Guidelines (SOGs). Airworthiness will be assured by inspections performed by a knowledgable Chief Technical Officer. Hazards to personnel on board aircraft are eliminated completely.

E. A Summary That Can Be Published In The Federal Register

MTI seeks exemption from:

14 C.F.R. Part 41
14 C.F.R. 43.3
14 C.F.R. 43.5
14 C.F.R. 61.113
14 C.F.R. 61.133
14 C.F.R. 91.9
14 C.F.R. 91.119
14 C.F.R. 151
14 C.F.R. 91.203 (a) & (b)
14 C.F.R. 91.405
14 C.F.R. 91.407
14 C.F.R. 91.409

This exemption will permit Mosher Thomas Industries L.L.C.to operate an Unmanned Aircraft System.

Respectfully submitted,

JOHNSON & LINDBERG, P.A.

Submitted June 5, 2015

s/ Michael C. Lindberg

Michael C. Lindberg
Attorney for Mosher Thomas L.L.C.
780 Northland Plaza
3800 American Boulevard West
Minneapolis, MN 55431-4459
(952) 851- 0700
Direct: (952) 956-6200
mlindberg@johnsonlindberg.com