Exemption No. 11448

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, DC 20591

In the matter of the petition of

YAMAHA MOTOR CORPORATION, U.S.A.

for an exemption from parts 21, 27; and §§ 45.23(b); 61.113(a) & (b); 91.7(a); 91.9(b)(2); 91.103; 91.109; 91.119; 91.121; 91.151(b); 91.203(a) & (b); 91.405(a); 91.407(a)(1); 409(a)(2); 91.417(a) & (b); 91.1501; 137.19(d); 137.19(e)(2)(ii), (iii), and (v); 137.31(a) & (b); 137.33(a); and 137.42 of Title 14, Code of Federal Regulations

Regulatory Docket No. FAA-2014-0397

GRANT OF EXEMPTION

By letter posted to the public docket on June 13, 2014,[1] Mr. David P. Murray, Willkie Farr & Gallagher, LLP, Counsel for Yamaha Motor Corporation, U.S.A., 1875 K Street, N.W., Washington, DC 20006 petitioned the Federal Aviation Administration (FAA) on behalf of Yamaha Motor Corporation, U.S.A. (Yamaha) for an exemption from parts 21, 27, and §§ 45.23(b), 61.113(a) & (b), 91.7(a), 91.9(b)(2), 91.103, 91.109, 91.119, 91.121, 91.151(b), 91.203(a) & (b), 91.405(a), 91.407(a)(1), 91.409(a)(2), 91.417(a) & (b), 91.1501, 137.19(d), 137.19(e)(2)(ii), (iii), and (v), 137.31(a) & (b), 137.33(a), and 137.42 of Title 14, Code of Federal Regulations (14 CFR). Yamaha petitioned for an exemption to operate the Yamaha RMAX for the purpose of providing commercial agricultural-related services.

The petitioner requests relief from the following regulations:

Part 21 prescribes, in pertinent part, the procedural requirements for issuing and changing design approvals, productions approvals, airworthiness certificates, and airworthiness approvals.

[1] By letter dated November 6, 2014, the petitioner responded to the FAA's request for information.

Part 27 prescribes, in pertinent part, the airworthiness standards for the issuance of type certificates for normal category rotorcraft with maximum weights of 7,000 pounds or less and nine or less passenger seats.

Section 45.23(b) prescribes, in pertinent part, that when marks include only the Roman capital letter "N" and the registration number is displayed on limited, restricted or light-sport category aircraft or experimental or provisionally certificated aircraft, the operator must also display on that aircraft near each entrance to the cabin, cockpit, or pilot station, in letters not less than 2 inches nor more than 6 inches high, the words "limited," "restricted," "light-sport," "experimental," or "provisional," as applicable.

Sections 61.113(a) and (b) prescribe that—

(a) no person who holds a private pilot certificate may act as a pilot in command of an aircraft that is carrying passengers or property for compensation or hire; nor may that person, for compensation or hire, act as pilot in command of an aircraft.
(b) a private pilot may, for compensation or hire, act as pilot in command of an aircraft in connection with any business or employment if:

(1) The flight is only incidental to that business or employment; and

(2) The aircraft does not carry passengers or property for compensation or hire.

Section 91.7(a) prescribes, in pertinent part, that no person may operate a civil aircraft unless it is in an airworthy condition.

Section 91.9(b)(2) prohibits operation of U.S.-registered civil aircraft 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.

Section 91.103 prescribes, in pertinent part, that each pilot in command shall, before beginning a flight, become familiar with all available information concerning that flight, to include—

(a) For a flight under IFR or a flight not in the vicinity of an airport, weather reports and forecasts, fuel requirements, alternatives available if the planned flight cannot be completed, and any known traffic delays of which the pilot in command has been advised by ATC;

(b) For any flight, runway lengths at airports of intended use, and the following takeoff and landing distance information:

(1) For civil aircraft for which an approved Airplane or Rotorcraft Flight Manual containing takeoff and landing distance data is required, the takeoff and landing distance data contained therein; and

(2) For civil aircraft other than those specified in paragraph (b)(1) of this section, other reliable information appropriate to the aircraft, relating to aircraft performance under expected values of airport elevation and runway slope, aircraft gross weight, and wind and temperature.

Section 91.109 prescribes, in pertinent part, that no person may operate a civil aircraft (except a manned free balloon) that is being used for flight instruction unless that aircraft has fully functioning dual controls.

Section 91.119 prescribes, in pertinent part, that, 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.

(d) *Helicopters, powered parachutes, and weight-shift-control aircraft.* If the operation is conducted without hazard to persons or property on the surface

(1) A helicopter may be operated at less than the minimums prescribed in paragraph (b) or (c) of this section, provided each person operating the helicopter complies with any routes or altitudes specifically prescribed for helicopters by the FAA;

Section 91.121 requires, in pertinent part, 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."

Section 91.151(b) prescribes, in pertinent part, that 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.

Section 91.203(a) prohibits, in pertinent part, any person from operating a civil aircraft unless it has within it (1) an appropriate and current airworthiness certificate; and (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).

Section 91.203(b) prescribes, in pertinent part, that no person may operate a civil aircraft unless the airworthiness certificate 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.

Section 91.405(a) requires, in pertinent part, that an aircraft owner or operator shall have that aircraft inspected as prescribed in subpart E of the same part and shall, between required inspections, except as provided in paragraph (c) of the same section, have discrepancies repaired as prescribed in part 43 of the chapter.

Section 91.407(a)(1) prohibits, in pertinent part, any person from operating an aircraft that has undergone maintenance, preventive maintenance, rebuilding, or alteration unless it has been approved for return to service by a person authorized under § 43.7 of the same chapter.

Section 91.409(a)(2) prescribes, in pertinent part, that no person may operate an aircraft unless, within the preceding 12 calendar months, it has had an inspection for the issuance of an airworthiness certificate in accordance with part 21 of this chapter.

Section 91.417(a) and (b) prescribe, in pertinent part, that—

(a) Each registered owner or operator shall keep the following records for the periods specified in paragraph (b) of this section:

(1) Records of the maintenance, preventive maintenance, and alteration and records of the 100-hour, annual, progressive, and other required or approved inspections, as appropriate, for each aircraft (including the airframe) and each engine, propeller, rotor, and appliance of an aircraft. The records must include—

(b) The owner or operator shall retain the following records for the periods prescribed:

(1) The records specified in paragraph (a)(1) of this section shall be retained until the work is repeated or superseded by other work or for 1 year after the work is performed.

(2) The records specified in paragraph (a)(2) of this section shall be retained and transferred with the aircraft at the time the aircraft is sold.

(3) A list of defects furnished to a registered owner or operator under § 43.11 of this chapter shall be retained until the defects are repaired and the aircraft is approved for return to service.

Section 91.1501 requires, in pertinent part, that operators support the continued airworthiness of each airplane including revising the inspection program, incorporating design changes, and incorporating revisions to Instructions for Continued Airworthiness.

Section 137.19(d) prescribes, in pertinent part, that the applicant for an agricultural aircraft operator certificate must have at least one certificated and airworthy aircraft, equipped for agricultural operation.

Sections 137.19(e)(2)(ii), (iii), and (v) prescribe, in pertinent part, the tests of skill for agricultural aircraft operations that must be demonstrated by the applicant in the areas of (ii) approaches to the working area, (iii) flare-outs, and (v) pullups and turnarounds.

Section 137.31(a) prescribes, in pertinent part, that no person may operate an aircraft unless that aircraft meets the requirements of Sec. 137.19(d).

Section 137.31(b) prescribes, in pertinent part, that no person may operate and aircraft unless that aircraft is equipped with a suitable and properly installed shoulder harness for use by each pilot.

Section 137.33(a) prescribes, in pertinent part, that no person may operate an aircraft unless a facsimile of the agricultural aircraft operator certificate, under which the operation is conducted, is carried on that aircraft.

Section 137.42 prescribes, in pertinent part, that no person may operate an aircraft in operations required to be conducted under part 137 without a safety belt and shoulder harness properly secured about that person.

The petitioner supports its request with the following information:

The petitioner proposes to operate the RMAX UAS to conduct commercial agricultural-related services in the United States. The petitioner also intends to conduct commercial agricultural aircraft operations as described in 14 CFR, part 137. The RMAX is capable of providing a wide array of essential agricultural spraying services, including watering, fertilizers, pesticides, and herbicides. The RMAX can also be equipped with sensors and equipment to detect and monitor agricultural areas that require irrigation, fertilization, or other treatments.

The petitioner has provided the following information along with its petition to support its request for an exemption, which includes proprietary and/or confidential supporting documents:

1) RMAX training program;
2) Yamaha RMAX Ground Theory Manual;
3) Yamaha RMAX Operations Manual; and
4) Yamaha RMAX Agricultural Guidebook

Documents 1 through 4 above are hereinafter collectively referred to as the operating documents.

The FAA has organized the petitioner's information into four sections: (1) the Unmanned Aircraft System (UAS), (2) the UAS Pilot in Command (PIC), (3) the UAS operating parameters, and (4) the public interest.

Unmanned Aircraft System (UAS)

The Yamaha RMAX is a remotely-piloted rotorcraft. It is 9 feet long and 3 feet 6 inches tall, has an empty weight of 141 lbs. and a load capacity of about 61 pounds for both liquid and granular applications. The main rotor is about 10 feet in diameter and extends 4 feet from either side of the RMAX and less than 3 feet from its front. The RMAX usually flies at a speed of no more than 12 mph (with a maximum speed of 45 mph). It is powered by a 2-cylinder, 246 cc engine that uses regular unleaded fuel with 2-stroke engine oil with a maximum output of 21 horsepower.

The petitioner states that the RMAX carries neither a pilot nor passenger and will operate within visual line of sight (VLOS) of a trained pilot and visual observer (spotter) only over uninhabited areas (e.g. fields, groves and orchards) and away from airports (i.e. three nautical miles or more) and populated areas.

The petitioner states that given the size, weight, speed, and limited operating area associated with the aircraft and its operation, an exemption from 14 CFR part 21, Subpart H (Airworthiness Certificates), subject to certain conditions and limitations, is warranted and meets the requirements for an equivalent level of safety under 14 CFR part 11 and Section 333 of P.L. 112-95 (Section 333). The petitioner further states that UAS operated without an airworthiness certificate in the restricted environment and under the conditions and limitations proposed by the petitioner will be at least as safe, or safer, than a conventional aircraft (fixed wing or rotorcraft) operating with an airworthiness certificate issued under 14 CFR part 21, Subpart H and not subject to the proposed conditions and limitations.

The petitioner further cites the well-established performance and safety record of the RMAX with its 20 year history of use in Japan and its recent approved use in Australia and South Korea. The RMAX has also been flown in the United States as a public aircraft for research and development purposes. The petitioner states that the RMAX has logged over 2 million flight hours, treating more than 2.4 million acres of farmland each year in Japan alone. During the this two decade period, there have been no injuries due to problems with the aircraft in Japan, Australia or South Korea and in the limited instances where a problem with the aircraft has occurred, the RMAX has either been safely landed and shut down by the pilot or fallen to the ground without personal injury. There have been no collisions with other aircraft.

The petitioner also states that the RMAX has a host of onboard safety systems, including: a self-monitor function (diagnostic before takeoff); altitude control system (YACS); global positioning system (GPS) flight control system; lost link safety default (hover and land); YACS and GPS warning/indicator lights; speed indicator light; and rotor brake (propellers tilt upon shut down to allow air resistance to quickly bring the propellers to full stop.

Regarding aircraft markings (§ 45.23), the petitioner states that even though the RMAX will have no airworthiness certificate, an exemption is warranted because it has no entrance to the cabin, cockpit, or pilot station on which the required marking can be displayed. Yamaha proposes instead to display markings to the fullest extent possible in compliance with the location requirements of § 45.27(a) and the size requirements of § 45.29(f).

Regarding maintenance and inspections, the petitioner states that the requirements in the pertinent sections of 14 CFR part 91 which refer to 14 CFR part 43 are only applicable to aircraft with an airworthiness certificate. However, the petitioner supports its request for relief from these maintenance requirements by describing and referencing specific RMAX maintenance and inspection procedures in the operating documents. Furthermore, equivalent levels of safety for maintenance and inspections can be achieved using the same kind of CASA-approved maintenance requirements and Yamaha's own certified technicians.

UAS Pilot in Command (PIC)

The petitioner states that § 61.113(a) limits private pilots to being in command of non-commercial flights (i.e., not for compensation or hire); while § 61.113(b) provides an exception that allows a private pilot to command an aircraft without passengers or property, in connection with business or employment if "[t]he flight is only incidental to that business or employment.

Yamaha states that the PIC of a RMAX would not meet the conditions of § 61.113(b) because the operation of the RMAX would not be incidental to the proposed agricultural-related services, but rather essential to it.

Yamaha is requesting an exemption from the limitation in § 61.113(a) that prohibits the holder of a private pilot certificate from acting as a PIC for compensation or hire. Alternatively, Yamaha is requesting an exemption from § 61.113(b) that would allow the holder of a private pilot certificate to act as PIC for compensation or hire even if the flight is not incidental to the business or employment of the PIC. Either of these requests, if granted, would allow a person holding a private pilot certificate to act as PIC of an RMAX operation for compensation or hire.

The petitioner states that it has integrated safety elements into the operation of the RMAX including comprehensive pilot and visual observer (spotter) training and certification requirements. These requirements, developed in cooperation with Australia's Civil Aviation Safety Authority (CASA) include: a comprehensive UAV training course which includes theory and practical components, a pilot theory exam, supervised flight training including agricultural spraying, completion of Yamaha's training program requirements including examination; and continued periodic training even after certification.

Completion and satisfaction of Yamaha training and certification requirements would be a condition for pilots and spotters operating the RMAX for agricultural purposes in the United

States. In addition, for agricultural-related operations that involve chemical applications, the pilot operating the RMAX would also be certified under the FAA's rules governing Agricultural Aircraft Operations, 14 CFR part 137.

UAS Operating Parameters

The petitioner states the following conditions will be observed in support of its ability to provide at least an equal level of safety or no adverse safety effect to persons or property in the air or on the ground:

a. The petitioner states that the RMAX will be operated within visual line of sight (VLOS) of the PIC.

b. The PIC is always accompanied by a trained "spotter" who is positioned at the opposite side of the agricultural area and is in constant radio communication with the pilot. The spotter ensures that the RMAX is always within line-of-sight and helps identify and alert the PIC to any potential obstacles on the ground or in the air.

c. Both the PIC and spotter will have completed a comprehensive training and certification program established by Yamaha prior to operation of the RMAX.

d. The PIC will take all preflight actions as set forth in its flight manual, which includes a comprehensive preflight checklist.

e. The RMAX will only be flown during daylight hours and in good weather.

f. The PIC and spotter will maintain a safe distance from the RMAX when it is operating as set forth in its flight manual.

g. UAS flights will be limited to a maximum altitude of 400 feet above ground level (AGL), and will normally be flown at altitudes of 20 feet AGL or less over a field or other agricultural area.

h. UAS flights will only be flown over uninhabited areas (e.g. fields, groves, and orchards) and away from airports (i.e. three nautical miles or more) or populated areas.

i. The maximum flight time for each UAS operation will be 60 minutes, with most agricultural flights lasting approximately 30 minutes.

j. Operations of the RMAX that meet the definition of an "agricultural aircraft operation" will be conducted in accordance with 14 CFR part 137.

The petitioner states that although the RMAX has sufficient fuel capacity to provide for one hour of flight time, flight times for agricultural-related purposes are typically only 30 minutes due to the RMAX's load capacity for spraying and other applications. The petitioner notes that the RMAX is typically refueled while it refills its payload, and thus is likely to comply with the 20-minute requirement from § 91.151(b), *Fuel requirements for flight in VFR conditions,* most of the time. Regardless of the potential for compliance, such a requirement is not necessary for the RMAX because it only operates 20 feet above an empty field, so the risk or danger associated with failing to reach a safe landing place is not present.

For the agricultural-related operations being requested, the petitioner intends to apply for an agricultural aircraft operator certificate issued under 14 CFR part 137. The petitioner has identified several sections of part 137 from which it seeks relief. Section 137.19(d) requires that an applicant for an agricultural aircraft operation has at least one certificated and airworthy aircraft. Section 137.31(a) prohibits agricultural operations in aircraft that do not meet § 137.19(d). The petitioner is requesting to conduct agricultural aircraft operations with RMAX aircraft that are not certificated, but are otherwise airworthy.

The petitioner requests relief from §§ 137.31(b) and 137.42 which require installation and use of a safety belt and shoulder harness by the pilot during agricultural aircraft operations. The petitioner states that since the RMAX is an unmanned aircraft (UA), these requirements are inapplicable. The petitioner states that an equivalent level of safety will be maintained by requiring the pilot and visual observer to maintain appropriate distances from the RMAX during operations to ensure their safety.

The petitioner also requests relief from certain requirements in section § 137.19(e)(2) that describe skill areas for maneuvers that are inapplicable to the RMAX when performing agricultural services. These include the demonstration of skill for the following maneuvers: (ii) approaches to the working area, (iii) flare-outs, and (v) pullups and turnarounds. Yamaha states that demonstrated compliance with the remaining applicable skills requirements of § 137.19(e)(2), along with the knowledge requirements of § 137.19(e)(1), will provide an adequate level of safety for operation of the RMAX.

The petitioner also requests relief from § 137.33(a) which requires that a facsimile of the agricultural aircraft operator certificate be carried on the aircraft. Similar to relief granted in Exemption 11062, because the RMAX is an unmanned aircraft, this requirement is not necessary. Yamaha proposes that RMAX pilots will have copies of the required certificates with them and available for inspection at all locations where and while the RMAX is being used to perform agricultural chemical spray application and dispensing services.

Public Interest

The petitioner states that in many applications, the RMAX has proven more economical and effective than other spraying methods, helping farmers increase productivity, lower costs, and reduce the amount of chemicals used. The petitioner further states that the RMAX can provide many agricultural services more efficiently, economically, and safely than other air-

or ground-based methods. Farmers, growers, and land managers, therefore, will immediately benefit from the availability of the spraying services. Further public benefits include greater operator safety on steep/slippery hills and terrain, reduced chemical usage, reduced operator and other human exposure to chemicals, no crop damage or soil compaction and greater fuel efficiency. Thus the grant of the requested exemptions is in the public interest.

Discussion of Public Comments:

A summary of the petition was published in the Federal Register on July 15, 2014 (79 FR 41350). Four comments were received. The Association of Unmanned Vehicle Systems International (AUVSI) supported the petition and the Air Line Pilots Association International (ALPA) opposed it. The National Agricultural Aviation Association (NAAA) and an individual commenter raised safety issues and concerns.

AUVSI stated that Yamaha's exemption outlines at least an equivalent level of safety over the use of a manned aircraft and it has adequately addressed the safety requirements in a number of Federal aviation regulations. In support of the petition, AUVSI cited the economic benefits of UAS used in agricultural operations, the 20 year service history of the RMAX, Yamaha's pilot and spotter training requirements, the low operating altitudes, and Yamaha's request to only operate over uninhabited areas and away from airports and other populated areas.

ALPA expressed concern regarding several aspects of the petition. ALPA stated that the petitioner's UAS performance characteristics are more akin to a manned helicopter. ALPA asserted that the impact of the petitioner's UAS on the NAS should be evaluated in comparison with small manned helicopters of similar size, technology and performance capabilities. ALPA noted that the anticipated operation would put the aircraft at the same altitude as other aircraft in the NAS with only geographic separation to mitigate the risk of collision. ALPA further noted that the aircraft "does not have a barometric altimeter". ALPA stated that processes or mitigations must be in place to ensure the UA can accurately maintain altitude, including engineering processes, software development and control, electronic hardware development and control, configuration management, and quality assurance to ensure the aircraft and its control system(s) operate to the same level of safety as other aircraft operated commercially in the NAS.

ALPA commented that Communication and Command (C2) (typically referred to as command and control) link failures are one of the most common failures on UAS, and that lost link mitigations should require safe modes to prevent fly-a-ways or other scenarios. An individual commenter also expressed concerns about the need to prevent a fly-away situation. The FAA has inserted conditions and limitations in this exemption to mitigate the risk associated with such failures.

ALPA noted the petitioner must specify a means to meet see and avoid requirements in § 91.113 given the absence of an onboard pilot. The FAA notes that all flights must be operated within VLOS of the PIC and visual observer (VO).

ALPA commented on the petitioner's proposal to operate at least 3 NM from airports. ALPA noted that Class B, C, and D airspaces all have dimensions at the surface that exceed 3 NM. The FAA agrees with this concern and establishes through this exemption and related Certificates of Waiver or Authorization (COAs) safe operational distances from airports.

ALPA also identified that the RMAX is not equipped with a Mode C transponder, which is a requirement for operating within 30 nautical miles of a Class B airport, unless otherwise authorized by Air Traffic Control (ATC). The low operating altitudes within VLOS, in addition to a dedicated spotter, sufficiently mitigate the risk of a mid-air collision with other aircraft. The COA issued by the Air Traffic Organization (ATO) to approve specific operations within the Mode C veil, if any, will address specific risk mitigations to ensure those operations are conducted safely.

ALPA also noted that the petitioner's proposed operations are for "compensation or hire," and therefore contends the pilot must hold at least a current FAA commercial pilot certificate with an appropriate category and class rating for the type of aircraft being flown, as well as specific and adequate training on the UAS make and model intended to be used. Similarly, ALPA asserted a current second-class airman medical certificate should be required. NAAA also commented on pilot qualification, stating it is necessary for the FAA to evaluate pilots of unmanned aircraft on their knowledge and skills in UAS operation. Requirements for this licensing should be developed along with other rigorous rules and qualifications to ensure safe integration of the unmanned aircraft into the NAS.

The FAA has reviewed the knowledge and training requirements of sport, recreational, private and commercial certificates and concluded that a UAS PIC holding a minimum of a sport pilot certificate, and operating under this exemption, would not adversely affect operations in the NAS or present a hazard to persons or property on the ground. Additional discussion of the FAA's review is found in the FAA's Analysis section of this exemption.

ALPA also expressed concern that the petitioner's request is not for a single specific operation or location, but for all operations of the same general type. ALPA stated that this results in a considerable increase in the FAA's oversight tasks. The FAA notes ALPA's concern and in order to minimize potential impact to the NAS, the FAA requires that each operator secure COA which covers specific details of the petitioner's operation. The FAA recognizes that UAS integration will generate new NAS access demand and will review and adjust accordingly.

NAAA noted that its members operate in low-level airspace, and therefore clear low-level airspace is vital to the safety of these operators. NAAA stated that seeing and avoiding other aircraft and hazardous obstructions is the backbone for agricultural safety, and that agricultural pilots depend on pilots of other aircraft to perform their see-and-avoid functions to prevent collisions. NAAA believes UAS operations at low altitudes will increase the potential for collision with agricultural aircraft.

The FAA recognizes these concerns and has incorporated associated conditions and limitations into this exemption, including: (a) a Notice to Airmen (NOTAM) issued for all operations; (b) operations conducted within VLOS of the pilot in command (PIC) and the VO; and (c) the UAS PIC must always yield right-of-way to manned aircraft.

NAAA stated that FAA airworthiness certification should be a requirement for all unmanned aircraft to operate within the NAS. NAAA recommended UAS be equipped with ADS-B or similar identification and positioning systems, strobe lights, high-visibility markings and registration numbers. NAAA also recommended UAS be operated strictly within the line-of-sight of the ground controller, with the assistance of a VO and clear of any low-flying manned aircraft.

With regard to the petitioner's requested relief from 14 CFR part 137, *Agricultural Aircraft Operations*, NAAA stated that part 137 was created with agricultural aircraft in mind in order to facilitate the necessary exemptions to allow them to perform their missions properly and safely without relying on FAA waivers to be issued for normal agricultural operations. NAAA further stated that while UAS were not envisioned when part 137 was originally written, it believes the intention of the section needs to be applicable to all agricultural aircraft and not limited to manned aircraft. NAAA noted that part 137 sets out a number of requirements, including a knowledge and skills test, which is crucial for both manned and unmanned agricultural pilots to understand. NAAA acknowledged that while some provisions of Part 137 are impractical for UAS, it believes that the RMAX needs to be required, to the greatest extent practicable, to comply with part 137 operating requirements, including airworthiness certification § 137.19(d), rather than grant a blanket exemption for the entire part. The FAA is requiring that Yamaha comply with part 137 to the extent possible as discussed below.

As discussed in greater detail below, Section 333 of the FAA Modernization and Reform Act of 2012 authorizes the Secretary of Transportation to determine, considering a number of factors laid out in the statute, that an airworthiness certificate is not necessary for certain operations. The Secretary has made that determination in this case and therefore the aircraft operated by the petitioner will not need to be certificated by the FAA.

The FAA's analysis is as follows:

The FAA has organized its analysis into five sections: (1) the UAS, (2) the UAS PIC, (3) the UAS operating parameters, (4) the UAS operating certificate, and (5) the public interest.

<u>UAS</u>

The petitioner requested relief from 14 CFR part 21, *Certification Procedures for Products and Parts,* and 14 CFR part 27, *Airworthiness Standards: Normal Category Rotorcraft*. In accordance with the statutory criteria provided in Section 333 of P.L. 112-95 in reference to 49 USC § 44704, and in consideration of the size, weight, speed, operational capabilities, design safety features, 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. Because of the size, method of operation, and speed of the RMAX, operation of the RMAX under the conditions and limitations below will not adversely impact safety. An engineering review of the data supplied to the FAA during its evaluation supports this finding. Therefore, the FAA finds that the requested relief from 14 CFR parts 21 and 27, and any associated noise certification and testing requirements of part 36, are not necessary.

The RMAX is larger and heavier than UAS previously approved to operate under Section 333. The FAA reviewed engineering data supplied by the petitioner to assess whether the increase in size and weight would adversely impact safety. Our evaluation considered risk mitigating factors such as RMAX service history, pilot and spotter training requirements, system safety features, the intended low-altitude and remote area of operations, and other operating limitations.

The RMAX UAS has been in operation since 1997 and logged more than two million flight hours. There are approximately 2,600 RMAX UAS in use worldwide. Yamaha has developed production, certification, operation, and maintenance requirements for the RMAX. Yamaha provided data that demonstrates the RMAX historical safety record for the types of agricultural service operations being requested in its petition.

Manned aircraft conducting agricultural operations can weigh thousands of pounds and carry hundreds of gallons of fuel and payload. The RMAX weighs approximately 200 lbs. and carries about 2 gallons of fuel and 4 gallons of payload. Manned aircraft are operated by an onboard pilot and may carry other onboard crewmembers. The RMAX pilot and crew will be remotely located from the aircraft and will remain outside a designated safety zone when the RMAX is operating, ensuring that the pilot and observer are never so close to the RMAX to pose a hazard to the crew. The risk to an onboard pilot and crew during an incident or accident is eliminated with the use of a UAS for the proposed operation.

Manned aircraft are at risk of fuel spillage and fire in the event of an incident or accident. The RMAX carries much less fuel and would impact the surface with less energy than a manned aircraft and therefore lowers the potential risk and severity of fire following an incident or accident due to fuel or payload spillage.

The petitioner's UAS has on-board safety features that ensure the UAS can operate safely under both normal and contingency operating conditions. These features include automation to increase safety and reduce pilot workload. Some examples are the self-monitoring function (pre-takeoff diagnostics), an altitude control system (YACS), and a GPS flight control system. The lost-link safety default feature allows the RMAX to automatically hover and land in response to a lost-link event. Safety features such as the YACS and GPS warning/indicator lights and speed indicator light provide critical system status information to the pilot. When concluding a flight, the rotor brake feature causes the propellers to tilt upon shut down to allow air resistance to quickly bring the propellers to full stop. These safety features ensure that these operations will not adversely impact safety compared to a manned aircraft

performing a similar operation and address ALPA's comments on mitigating risk of command and control link failures.

The petitioner's requested relief from 14 CFR § 45.23(b), *Display of marks: general,* is not necessary because its UAS will not be certificated under 14 CFR § 21.191. The petitioner's UA 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 per § 45.29(f).

The petitioner requested relief from 14 CFR §§ 91.405(a), *Maintenance required,* 91.407(a)(1), *Operation after maintenance, preventive maintenance, rebuilding, or alteration,* 91.409(a)(2) *Inspections,* and 91.417(a) and (b) *Maintenance records.* The FAA has determined that relief from § 91.409(a)(1) is also necessary. Data provided by the petitioner indicates the main rotor system has not experienced any mechanical failures and the only documented tail rotor failures occurred prior to a design change in 2003. The petitioner has a documented history of correcting mechanical failures through design changes, improving the reliability of the system. The average mechanical failure rate from 2009-2013 was 1 per 46,500 flight hours. The FAA has considered these factors in its evaluation of the petitioner's request and determined that adherence to the conditions and limitations below regarding the responsibilities for maintaining, inspecting, and pre-flight inspection are sufficient to ensure that safety will not be adversely affected. Therefore the FAA finds that exemption from 14 CFR §§ 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b) is warranted subject to the conditions and limitations below.

UAS PIC

The FAA has analyzed the petitioner's proposed operation and has determined that it does not differ significantly from the situation described in Grant of Exemption No. 11213 to Aeryon Labs, Inc. (Docket No. FAA-2014-0642). Therefore, the FAA finds that a PIC conducting operations under this grant of exemption may operate the UAS for compensation or hire, or in furtherance of a business, with any of the following pilot certificates: sport, recreational, private, commercial, or airline transport. Additionally, a PIC must hold and possess either a medical certificate issued under 14 CFR part 67 or a U.S. issued driver's license irrespective of the pilot certificate held. In addition, PICs must comply with 14 CFR § 61.53, *Prohibition on operations during medical deficiency*.

Operating Parameters of the UAS

The petitioner's operating documents describe operational procedures and limitations developed for the RMAX to provide mitigate potential safety risk to persons and property. The FAA considered these procedures and limitations in determining the proposed operations can be conducted safely.

The petitioner has requested relief from 14 CFR § 91.7(a), *Civil aircraft airworthiness.* While the petitioner's UAS will not require an airworthiness certificate, the FAA has determined

that for the purposes of this exemption the pilot may determine the aircraft is in an airworthy condition prior to flight. The FAA's regulations state that the PIC of a civil aircraft is responsible for determining whether the aircraft is in a condition for safe flight. Therefore, relief from § 91.7(a) is granted and relief from § 91.7(b) is not necessary.

The petitioner requested relief from 14 CFR § 91.9(b)(2), *Civil aircraft flight manual, marking, and placard requirements* and § 91.203(a) and (b): *Civil aircraft: Certifications required.* The FAA has previously determined that relief from these sections is not necessary. *See* Exemption No. 11062. Relevant materials may be kept in a location accessible to the PIC in compliance with the regulations.

The petitioner requested relief from 14 CFR § 91.103 *Preflight Action.* The PIC will take all actions including reviewing weather, flight battery requirements, landings, and takeoff distances and aircraft performance data before initiation of flight. The FAA has imposed stricter requirements with regard to visibility and distance from clouds; this is to both keep the UA from departing the VLOS and to preclude the UA from operating so close to a cloud as to create a hazard to other aircraft operating in the NAS. The FAA also notes the risks associated with sun glare; the FAA believes the that PIC's and VO's ability to still see other air traffic, combined with the PIC's ability to initiate a return-to-home sequence, are sufficient mitigations in this respect. The PIC will also account for all relevant site-specific conditions in his or her preflight procedures. Therefore, the FAA is not granting relief from § 91.103.

While the petitioner requested relief from 14 CFR § 91.109 *Flight instruction; Simulated instrument flight and certain flight tests*, the petition did not describe training scenarios in which a dual set of controls would be utilized or required, i.e. dual flight instruction, provided by a certificated flight instructor or other company-designated individual, which would require that individual to have fully functioning dual controls. The FAA is requiring that the petitioner's PICs possess at least a sport pilot certificate. This exemption will also require that training operations only be conducted during dedicated training sessions. As such, the FAA finds that the petitioner can conduct its operations without the requested relief from § 91.109.

Regarding the petitioner's requested relief from 14 CFR § 91.119, *Minimum safe altitudes: General*, the petitioner states that the RMAX will be operated at altitudes below 500 feet AGL and closer than 500 feet to persons, primarily the PIC and visual observer, although the PIC and VO will always maintain a safe distance from the RMAX as required by the operating documents. The RMAX will only be flown over uninhabited areas. Therefore, regarding the relief requested, the FAA finds that:

a. Relief from § 91.119(a), which requires operating at an altitude that allows a safe emergency landing if a power unit fails, is not granted. The FAA expects the petitioner to be able to perform an emergency landing without undue hazard to persons or property on the surface if a power unit fails.
b. Relief from § 91.119(b), operation over congested areas, is not applicable, because this grant of exemption prohibits operations over congested or densely populated areas.
c. Relief from § 91.119(c) is necessary because the aircraft will be operated at altitudes below 500 feet AGL. Section 91.119(c) states that no person may operate an aircraft

below the following altitudes: *over other than congested areas*, an altitude of 500 feet above the surface, except over open water or sparsely populated areas. The FAA finds operations conducted in compliance with the conditions and limitations in this grant of exemption warrant relief from § 91.119(c).

d. Relief from § 91.119(d) is not applicable.

Regarding the petitioner's requested relief from 14 CFR § 91.121, *Altimeter settings*, when the UA is equipped with a barometric altimeter, relief from § 91.121 is not necessary. When the UA is not equipped with a barometric altimeter, an alternate means for measuring and reporting UA altitude is necessary, such as GPS. As stated in the conditions and limitations below, the FAA requires altitude be reported in feet AGL. The petitioner may choose to set the altitude indicator to zero feet AGL rather than local barometric pressure or field altitude before flight. Considering the limited altitude of the proposed operations, relief from 14 CFR § 91.121 is granted to the extent necessary to comply with the applicable conditions and limitations stated below.

Regarding petitioner's requested relief from 14 CFR § 91.151(b), *Fuel requirements for flight in VFR conditions*, prior UAS specific relief has been granted in Exemption Nos. 8811, 10808, and 10673 for daytime, Visual Flight Rules (VFR) conditions. The conditions and limitations below prohibit the PIC from beginning a UAS flight unless (considering wind and forecast weather conditions) there is enough available fuel for UAS to operate for the intended operational time and to operate after that for at least five minutes or with the reserve fuel recommended by the manufacturer if greater. The FAA finds that this provides sufficient reason to grant the relief from 14 CFR § 91.151.

The petitioner requested relief from 14 CFR § 91.1501, *Continued Airworthiness and Safety Improvements – Purpose and definition*. This regulation requires operators to support the continued airworthiness of each airplane. While under this grant of exemption petitioner is permitted to operate without an airworthiness certificate, the PIC is still required to ensure the aircraft is in a condition for safe flight prior to each operation. Therefore, relief from § 91.1501 is not applicable.

<u>UAS Operating Certificate</u>

The petitioner did not request relief from § 137.19(c), *Certification requirements*, which requires the applicant for a commercial agricultural aircraft operator certificate to have available the services of at least one person who holds a current U.S. commercial or airline transport pilot certificate and who is properly rated for the aircraft to be used. The petitioner requests to conduct commercial agricultural aircraft operations under 14 CFR part 137, *Agricultural Aircraft Operations*, with persons holding a private pilot certificate. The FAA has determined that relief from § 137.19(c) is necessary to the extent necessary to permit persons holding a sport, recreational, or private pilot certificate to act as PIC for commercial agricultural aircraft operations. The basis for this relief is the same as discussed in the UAS PIC section above. The PIC must still comply with the additional knowledge and applicable skill requirements in part 137 as well as the petitioner's training requirements in the operating documents. Lastly, because of the relief provided to § 137.19(c), we also provide relief to the pilot certificate requirements of § 137.41(c), *Personnel*.

Regarding the requested relief from §§ 137.19(d), *Certification requirements,* and 137.31(a), *Aircraft requirements,* Yamaha states that it will retain custody of the RMAX UAS and the agricultural related services would be under the direction, supervision, and control of Yamaha. As stated in the analysis above, and consistent with the Secretary's determination that airworthiness certification is not necessary, the FAA finds that relief from 14 CFR parts 21 and 27 is not necessary.

The FAA has determined that based on Yamaha's safe operating history of the RMAX, and the RMAX design safety features, operations conducted under the requirements of this exemption will not adversely impact safety. Thus, although the RMAX is not certificated, the FAA finds that relief from §§ 137.19(d) and 137.31(a) is warranted to the extent necessary to permit the RMAX to be operated in commercial agricultural aircraft operations. Although relief from the requirement for the aircraft to be certificated is granted, prior to operating, the aircraft must be in a condition for safe flight in accordance with § 91.7(b).

Regarding the requested relief from § 137.19(e)(2)(ii), (iii), and (v), *Certification requirements,* the FAA has determined that demonstration of the skills described in these paragraphs is not necessary because they are not compatible or applicable to the operation of the RMAX during agricultural aircraft operations as described in the petitioner's operating documents. Yamaha's RMAX training and certification program provides the PIC with the necessary skills to safely operate the RMAX. Granting relief from a demonstration of the skills described in § 137.19(e)(2)(ii), (iii), and (v) does not adversely impact safety, therefore relief is warranted. Skill requirements in the other sections of § 137.19(e)(2) not exempted must be demonstrated as required for certification as a agricultural aircraft operator under 14 CFR part 137. If the operating procedures of the RMAX ever change or evolve to require the PIC to perform any of the skills described in 137.19(e)(2)(ii), (iii), and (v), Yamaha must petition for amendment to this grant. Lastly, because of the relief provided to § 137.19(e)(2)(ii), (iii), and (v), the FAA also grants relief from those portions of the associated knowledge and skill test requirements of § 137.41(c),

Regarding the petitioner's requested relief from §§ 137.31(b), *Aircraft requirements*, and § 137.42, *Fastening of safety belts and shoulder harnesses,* the FAA finds that an exemption from these requirements related to the installation and use of a shoulder harness and safety belt is warranted because the RMAX is an unmanned aircraft with no onboard pilot. These requirements are intended to ensure the safety of the onboard pilot during manned agricultural aircraft operations and thus, relief from §§ 137.31(b) and 137.42 does not adversely impact safety.

Regarding the petitioner's requested relief from § 137.33(a), *Carrying of certificate,* which requires that a facsimile of the agricultural aircraft operator certificate be carried on the aircraft, the FAA finds that relief is necessary and warranted. The FAA has previously determined that relief from §§ 91.9(b)(2) and 91.203(a) and (b) for the carriage of the aircraft flight manual and aircraft registration onboard the aircraft is not necessary. The FAA finds that this analysis is applicable to the requirements of § 137.33(a). These documents may be

kept in a location accessible to the PIC. Therefore, a facsimile of the agricultural aircraft operator certificate may also be kept in a location accessible to the PIC.

Public Interest

The FAA finds that a grant of exemption is in the public interest. The enhanced safety achieved using a 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.

The table below summarizes the FAA's determinations regarding regulatory relief:

Relief considered (14 CFR)	**FAA determination**
Part 21	Relief not necessary
Part 27	Relief not necessary
45.23(b)	Relief not necessary
61.23(a) and (c)	Relief granted with conditions and limitations
61.101(e)(4) and (5)	Relief granted with conditions and limitations
61.113(a)	Relief granted with conditions and limitations
61.113(b)	Relief not necessary
61.133	Relief not necessary
91.7(a)	Relief granted with conditions and limitations
91.9(b)(2)	Relief not necessary
91.103	Relief not granted
91.109	Relief not granted
91.119(a)	Relief not granted
91.119(b) and (d)	Not applicable
91.119(c)	Relief granted with conditions and limitations
91.121	Relief granted with conditions and limitations
91.151	Relief granted with conditions and limitations
91.203(a) and (b)	Relief not necessary
91.405(a)	Relief granted with conditions and limitations
91.407(a)(1)	Relief granted with conditions and limitations
91.409(a)(1) and (2)	Relief granted with conditions and limitations
91.417(a) and (b)	Relief granted with conditions and limitations
91.1501	Relief not necessary

Relief considered (14 CFR)	FAA determination
137.19(c)	Relief granted with conditions and limitations
137.19(d)	Relief granted with conditions and limitations
137.19(e)(2)(ii), (iii), and (v)	Relief granted with conditions and limitations
137.31(a)	Relief granted with conditions and limitations
137.31(b)	Relief granted
137.33(a)	Relief granted with conditions and limitations
137.41(c)	Relief not necessary
137.42	Relief granted with conditions and limitations

The FAA's 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, Yamaha Motor Corporation, U.S.A. is granted an exemption from 14 CFR §§ 61.23(a) and (c); 61.101(e)(4) and (5); 61.113(a); 91.7(a); 91.119(c); 91.121; 91.151; 91.405(a); 91.407(a)(1); 91.409(a)(1) and (2); 91.417(a) and (b); 137.19(c) and (d),; 137.19(e)(2)(ii), (iii), and (v); 137.31(a) and (b); 137.33(a); and 137.42 to the extent necessary to allow the petitioner to operate the RMAX UAS for the purpose of agricultural-related services operations. This exemption is subject to the conditions and limitations listed below.

Conditions and Limitations:

In this grant of exemption, Yamaha Motor Corporation, U.S.A., 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 Yamaha RMAX Type II G UAS as described in the operating documents with a maximum take-off weight not to exceed 99 kg (218) pounds. Proposed operations of any other aircraft will require a new petition or a petition to amend this exemption.

2. The UA may not be operated at an airspeed exceeding 45 miles per hour. In no case will the UA be operated at airspeeds greater than the maximum UA operating airspeed recommended by the aircraft manufacturer.

3. 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.

4. 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.

5. 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.

6. 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.

7. 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.

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

9. 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.

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

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

12. 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.

13. The PIC and VO must be trained and qualified in accordance with the operating documents.

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 fuel for the UA to conduct the intended operation and to operate after that for at least five minutes or with the reserve fuel 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, 91.203, and 137.33(a), 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 considered participating 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.

Unless otherwise specified in this grant of exemption, the unmanned aircraft system (UAS), pilot in command (PIC), and operator must comply with all applicable parts of 14 CFR including, but not limited to, parts 45, 47, 61, 91, and 137.

This exemption terminates on May 31, 2017, unless sooner superseded or rescinded.

Issued in Washington, DC, on May 1, 2015.

/s/
John Barbagallo
Acting Director, Flight Standards Service