



August 4, 2014

Docket Management Facility  
U.S. Department of Transportation  
1200 New Jersey Avenue, SE  
West Building Ground Floor, Room W12 – 140  
Washington, DC 20590

**Re: Petition for Exemption: Yamaha Motor Corporation; Docket Number FAA-2014-0397**

To Whom It May Concern:

The National Agricultural Aviation Association (NAAA) appreciates the opportunity to comment on the FAA's request for comments on Yamaha Motor Corporation's petition for an exemption from various Federal Aviation Administration regulations in order to operate a Yamaha RMAX, an unmanned aircraft system (UAS), for commercial purposes performing aerial application and other functions.

#### **Importance of Aerial Application Industry**

The NAAA consists of more than 1,700 members in 46 states, and represents the interests of small business owners and pilots licensed as commercial applicators that use aircraft to enhance the production of food, fiber and bio-fuel; protect forestry; protect waterways and rangeland from invasive species; and control health-threatening pests. Aerial application is so important to agricultural, forestry and public health protection because it is by far the fastest method of application. Furthermore, when the presence of water, wet soil conditions, rolling terrain or dense plant foliage prevents the use of other methods of pesticide application, aerial application may be the only remaining method of treatment. Aerial application is also conducive to higher crop yields, as it is non-disruptive to the crop and causes no soil compaction. Applying crop protection products by air is an essential component of no-till or reduced tillage farming operations which limit storm water runoff and reduces soil erosion. These farming methods, through their preservation of organic matter and topsoil, help maintain productive soils and reduce greenhouse gas emissions through the sequestration of carbon. According to the USDA's Economic Research Service, there are a total of 408 million cropland acres in the U.S., of which approximately 70 percent are commercially treated with crop protection products. Further, according to NAAA data nearly 20 percent of commercial crop protection product applications are made through aerial applications. As a result, NAAA estimates that 71 million acres of cropland are treated via aerial application in the U.S. each year. This does not include the aerially treated pasture and rangeland of which there are 614 million total acres in the U.S. or the 671 million total forestry acres and 61 million total urban acres in the U.S.—a portion of which are treated by air.

Because aerial application is so important as aforementioned, it is vital a safe low-level airspace exists to ensure these pilots can continue to do their jobs safely. Ensuring safe low-level airspace includes minimizing obstructions which are difficult to be seen and identified by the pilots. In addition to aerial application operations, aircraft users of low-level airspace include: Emergency Medical Services (EMS), air tanker firefighting aircraft and their lead aircraft; power line and pipeline patrol aircraft; power line maintenance helicopters; fish and wildlife service aircraft; animal control aircraft (USDA-APHIS-ADC); military helicopter and fixed-wing operations; seismic operations (usually helicopters); livestock roundup (ranching or animal relocation); aircraft GIS mapping of cropland for noxious weed populations and the like; and others.

#### **Comments on Yamaha's Overall Proposal**

NAAA appreciates that Yamaha is developing technology to assist in small-scale aerial application in areas where it may not be economically feasible to utilize a manned aircraft. Our primary concern is the safety of agricultural and other pilots routinely operating in the lower-level of the National Airspace System (NAS) and to ensure the professionalism and quality of work conducted by the aerial application industry. It is the belief of the Association that the studies toward the safe integration of unmanned aircraft into the NAS, such as those being conducted at the six national test sites deemed by the FAA, should be completed prior to granting exemptions for unmanned aircraft operations. Without a thorough investigation into understanding the safety of mixing manned and unmanned aircraft, the safety of pilots operating at low level may be jeopardized.

NAAA also understands that the RMAX has an established safety record of over 20 years from use abroad, particularly Australia and Japan. However, the National Airspace System in the United States is unique compared to operations abroad in size and scope, and thus NAAA believes the Agency needs to take this into account.

1440 Duke Street, Alexandria, Va. 22314  
Telephone: (202) 546-5722 Fax: (202) 546-5726 [www.agaviation.org](http://www.agaviation.org)

The petitioners assert that the aircraft is "light" weighing in at 141 pounds dry weight plus a 61 pound payload capacity. This is however well outside what is generally considered a "small UAS" (55 pounds total weight), the category for which the FAA is planning a rule and the category which similar petitions are being considered by the Agency. With that said, impact with a bird weighing far less can cause major damage to an aircraft which may lead to a crash. Fatalities do occur as a result of these collisions, as referenced in the Part 21 section of our comments. In addition, the relatively small size of the RMAX compared to a manned aircraft makes the aircraft difficult to see if it should happen to be in the vicinity of a manned aircraft. It is important to note that pilots operating at low altitudes already have much to occupy their attention without having to assume the sole responsibility of maintaining separation from an aircraft without the ability to "sense and avoid" other aircraft, despite the fact that VFR flight relies on both aircraft to see and avoid each other. NAAA does not believe having a "spotter" negates the need for "sense and avoid" capabilities as Yamaha suggests.

NAAA understands that Yamaha has developed their own training course, however this course is not certified by the FAA, yet Yamaha is requesting exemption from the training requirements contained in Part 91. NAAA believes that the pilot/operator and the designated "spotter" should be required to demonstrate knowledge and skills on UAS operation to the FAA or an Agency designee, as manned aircraft pilots are required to do in order to ensure they are thoroughly familiar with the limitations of manned aircraft flight.

#### **Regulation Exemptions Sought**

NAAA submits the following comments on the specific regulations for which exemptions are being sought by this petition:

*14 CFR Part 21: Airworthiness Certification.* NAAA believes that all aircraft, manned or unmanned, operating in the NAS need to be constructed and maintained in accordance with FAA regulations in order to ensure that the aircraft are not a hazard to persons or property. Yamaha's claim that the RMAX "will be at least as safe, or safer, than a conventional aircraft (fixed wing or rotorcraft) with an airworthiness certificate" is unproven unless the aircraft goes through the certification (airworthiness) process. Despite the size of the UAS, it still presents a hazard to low-level pilots similar to that presented by birds and other low-level obstacles such as towers. According to a joint report by the FAA and the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (USDA-APHIS), between 1990 and 2012 over 131,000 wildlife strikes occurred with civil aircraft, 97 percent of which were the result of collision with birds, with 25 producing fatalities. Fully establishing airworthiness standards, which include strobe lighting and a identification system like an ADS-B Out system for UAS aircraft in the NAS will go a long way to ensuring that the hazards posed by the introduction of these new, small, difficult to see objects is mitigated. NAAA believes that the RMAX should be subject to similar airworthiness requirements as manned ag aircraft are under restricted category aircraft given the two categories of aircraft will be performing aerial application.

*14 CFR Part 27. Airworthiness Standards for Normal Category Rotorcraft.* NAAA believes that UAS need to be certified airworthy, as indicated in our comments relating to Part 21 Airworthiness Certification.

*14 CFR § 45.23 (b). Marking of Aircraft.* NAAA believes the request for exemption on the marking of aircraft totally ignores the requirement of § 45.23 (a) which requires each aircraft to be marked with an identifying number. This number is used to identify the owner of the particular aircraft in case of an incident and can be used to trace responsibility pertaining to operation of said aircraft. The aircraft should have assigned numbers that can be read from a suitable distance to aid in identification when enforcement of flight regulations is required. NAAA recognizes that the small size of the RMAX makes utilization of a visual-based identification system difficult, and therefore believes that use of a ADS-B like identification system for UAS could prove advantageous to both the aviation and law enforcement communities. NAAA appreciates that Yamaha intends to do this "to the fullest extent practical," however NAAA believes the FAA should require marking be clearly visible, rather than grant a blanket exemption.

*14 CFR § 61.113 (a) & (b): Private Pilot Privileges and Limitations: Pilot in Command.* NAAA believes that the part 61 regulations currently in effect do not address the licensing of pilots of an unmanned aircraft used for commercial purposes. We believe it is necessary for the FAA to evaluate pilots of these 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. This is even more especially the case with larger UAVs such as the RMAX.

*14 CFR § 91.7 (a): Civil aircraft airworthiness.* As aforementioned commented, NAAA believes airworthiness standards should be established for unmanned aircraft prior to their use in the NAS.

*14 CFR § 91.103: Preflight action.* NAAA believes that the pilot should perform preflight activities just as the pilot of a manned aircraft is required to accomplish. We emphasize the need to preflight the unmanned aircraft to see it is in a condition for safe operation and protection of persons on the surface and manned operations using the NAS.

*14 CFR § 91.109: Flight Instruction.* NAAA believes flight instruction toward the operation of an unmanned aircraft should be addressed as part of the requirements of operating rules for certifying pilots to safely integrate and operate unmanned aircraft in the NAS. Further, NAAA believes that dual flight control training is a critical part of flight training, and the RMAX should be required to perform training via a dual system, especially when operating utilizing hazardous chemicals. This is vital to ensure safety to persons and property on the ground, as well as aircraft in the air.

*14 CFR § 91.119: Minimum safe altitudes.* NAAA believes an exemption from this section is not warranted if the aircraft is operated by Part 137 certified operators under Part 137 conditions as suggested given §137.29 permits deviation for §91.119 by saying "The holder of an agricultural aircraft operator certificate may deviate from the provisions of part 91 of this chapter without a certificate of waiver, as authorized in this subpart for dispensing operations, when conducting non-dispensing aerial work operations related to agriculture, horticulture, or forest preservation in accordance with the operating rules of this subpart."

*14 CFR § 91.121: Altimeter Settings.* NAAA believes the unmanned aircraft's pilot must have a reliable means of determining the actual altitude of the aircraft to prevent exceeding the authorized flight altitude envelope.

*14 CFR § 91.151 (a): Fuel Requirements for Flight in VFR Conditions.* NAAA believes the intent of this regulation is to prevent a pilot of a manned aircraft from commencing a flight without properly planning the flight as required by § 91.103. The 30 minute VFR fuel reserve is specified to allow a margin of safety. Similar consideration should be given to unmanned aircraft flights to allow for unexpected circumstances such as needing to stay airborne longer due to an emergency situation. We believe that the FAA needs to establish a standard flight time the UAS needs to have in its power reserve to safely land (e.g. 10 minutes, 15 minutes, etc.).

*14 CFR § 91.405 (a); 407 (a)(1); 409 (a)(2); 417 (a) and (b): Maintenance inspections.* NAAA maintains that any aircraft, manned or unmanned, that is intended for use in the NAS system be adequately maintained and inspected. The criteria may be different from that used in manned aircraft but standards should be established and complied with. Records (maintenance logs) should be provided as proof that these requirements are being met.

*14 CFR § 91.1501 Continued Airworthiness.* NAAA maintains that UAS need to be certified airworthy, and thus subject to this section.

*14 CFR § Part 137 Agricultural Aircraft Operations.* 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. While UAS were not envisioned when Part 137 was originally written, we believe the intention of the section needs to be applicable to all agricultural aircraft and not limited to manned aircraft. Yamaha has already indicated they intend to utilize operators with Part 137 certification, we therefore believe that Yamaha has recognized the importance of this part to agricultural aircraft operations, and believe the aircraft needs to be subject to Part 137's rules as well.

Further, 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. This includes the knowledge required under §137.19(e)(1)(i – vi), which includes knowledge of safe handling of pesticides, symptoms of poisoning, performance capabilities of the aircraft to be used, and safe flight and application procedures. Part 137.19(e)(2)(i – vi) sets requirements for skills testing including approaches to the working area, swath runs, and quick stops (for helicopters). The knowledge required to be demonstrated in these parts, NAAA believes, is crucial to the safe application of pesticides and to the reputation of an industry vital to agricultural production as outlined earlier in these comments. NAAA believes granting a blanket waiver as requested by Yamaha would fundamentally undermine the principles the FAA established for safe pesticide application over the last several decades. It should also be noted that other federal agencies are responsible for the regulation of applying agricultural chemicals such as the Environmental Protection Agency and state pesticide control officials whose licenses and restrictions specifically regulate aerial application.

While some provisions of Part 137 are impractical for UAS, such as requiring pilot harnesses (§137.31(b)), we believe that the RMAX needs to be required, to the greatest extent practicable, to comply with 137 operating requirements, including airworthiness certification §137.19(d), rather than grant a blanket exemption for the entire part.

In summary and as aforementioned, the NAAA feels the safest course on UAS integration is to allow the FAA to collect test site data as is currently underway and complete its rulemaking on safe integration before making exemptions. NAAA also strongly urges the FAA to adopt the UAS safety recommendations listed below.

#### **Safety Concerns Associated with UAS**

The ability of pilots to see and avoid other aircraft and hazardous obstructions will save the lives of low-level aircraft pilots. Each year the users of low-level airspace are being exposed to a greater number of in-flight hazards. Communications towers, wind generation turbines and meteorological evaluation towers (METs) are being erected at an alarming rate. The recent interest in Airborne Wind Energy Systems (AWES) could potentially become a safety issue for low-level aviators as well. As with the METs and AWES, the widespread use of UAS will result in conditions ripe for low-level aviation accidents. Aircraft collisions with towers and other aircraft frequently result in fatal injuries. Accident records maintained by NAAA, as taken from NTSB accident reports, show there were 10 collisions between aircraft involving ag aircraft during the last 10 years (2004-2013). Two of these accidents involved a fatality. We have been fortunate because most of these collisions involved aircraft on or near the ground on takeoff or landing. These accidents prove the point, however, that collisions with aircraft occur and they will nearly certainly occur at a more frequent rate with UAVs if a manned pilot is unaware of the UAVs location because it is not equipped with electronic tracking or properly lit.

The possibility of a non-fatal outcome decreases dramatically when the collision occurs at altitude in cruise flight. Because of these accidents, the agricultural aviation industry places a great amount of importance on the ability to see and identify obstructions and other aircraft in the airspace in which they operate. The operating realm of the ag pilot, by the nature of the work performed, must be located in the air but near the ground. The principal of "see and avoid" is the backbone of safety for ag pilots. Our pilots depend on the pilot of the other aircraft to do their part in avoiding collisions. UAS should be able to perform this function in some manner. A system of aircraft identification such as ADS-B Out like tracking as aforementioned, should provide the added safety of aircraft location and recognition.

Additionally, the UAS should be painted in colors which make it readily distinguishable from the background, such as aviation orange and white, and a strobe light used to increase its conspicuousness. The inability to distinguish an obstruction from the background is dramatically illustrated by a number of fatal collisions with unmarked MET towers that our industry has experienced over the past several years. Accident records maintained by the NAAA, as taken from NTSB accident reports, show that during the last 10 years (2004-2013), 12 agricultural aircraft collided with towers and 88 collided with power lines or their supporting structures. Six of the tower and seven of the wire strikes were fatal. The same principal applies if the UAS is not of the proper color with strobe lights to increase visibility.

#### **Operational Safety**

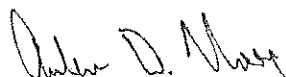
NAAA requests that operators of UAS develop ways of making the presence of UAS known to VFR air traffic if they are to be integrated into the NAS. Databases should be developed showing areas where UAS operations are occurring and requirements should be made for UAS operators to log their activities within these databases before operations commence. For areas with less UAS activity, a procedure for issuing NOTAMs when they are present should be explored. NAAA believes it is imperative for users of the NAS and residents and landowners within the areas of UAS usage to be able to safely utilize the services of agricultural aircraft and other low level operations without jeopardizing the aircraft occupant's safety. Otherwise, blocks of farm land in UAS high-usage areas may be untreatable by air. Agricultural producers are aware of the necessity of quickly treating their crops when a potential yield threat such as plant disease or insects strike.

The issue of protecting all pilots from mid-air collisions, when they are operating in close proximity to unmanned aircraft is vitally important. In the case of agricultural aviators, timely treatment of the crop is an issue of great importance to the safe, affordable and abundant production of food, fiber and bio-fuel to our global population.

NAAA is aware of the important functions which can be accomplished by UAS, potentially even to agriculture but at the same time protecting the safety of current and future users of the NAS is mandatory. NAAA appreciates the FAA addressing this life-saving issue vital to the agricultural aviation industry, and urges the Agency to consider the above stated comments in an effort to strengthen aviation safety overall.

Thank you for the opportunity to comment.

Sincerely,



Andrew D. Moore  
Executive Director