

## AMA D1 Limited-RID UAS & Geo-Fencing Comment

My name is Andy Argenio and I am writing today not as an Academy of Model Aeronautics (AMA) Executive Board Member but as the Chairperson of AMA's Advanced Flight Systems Committee (AFSC) whose members are deeply concerned with proposals in the FAA's NPRM for Remote-Identification (RID). Specifically, we have safety and utilization issues with FAA's technology choices for Standard and Limited RID and their design and performance requirements for UAS/model-aircraft.

The AFSC recognizes and supports the need for RID to be incorporated into certain UAS for commercial and/or recreational use. We are disappointed that the FAA decided not to accept the recommendation from its UAS RID Aviation Rule Committee (ARC) to exempt UAS that operated in compliance with CFR part 101 or by AMA members.

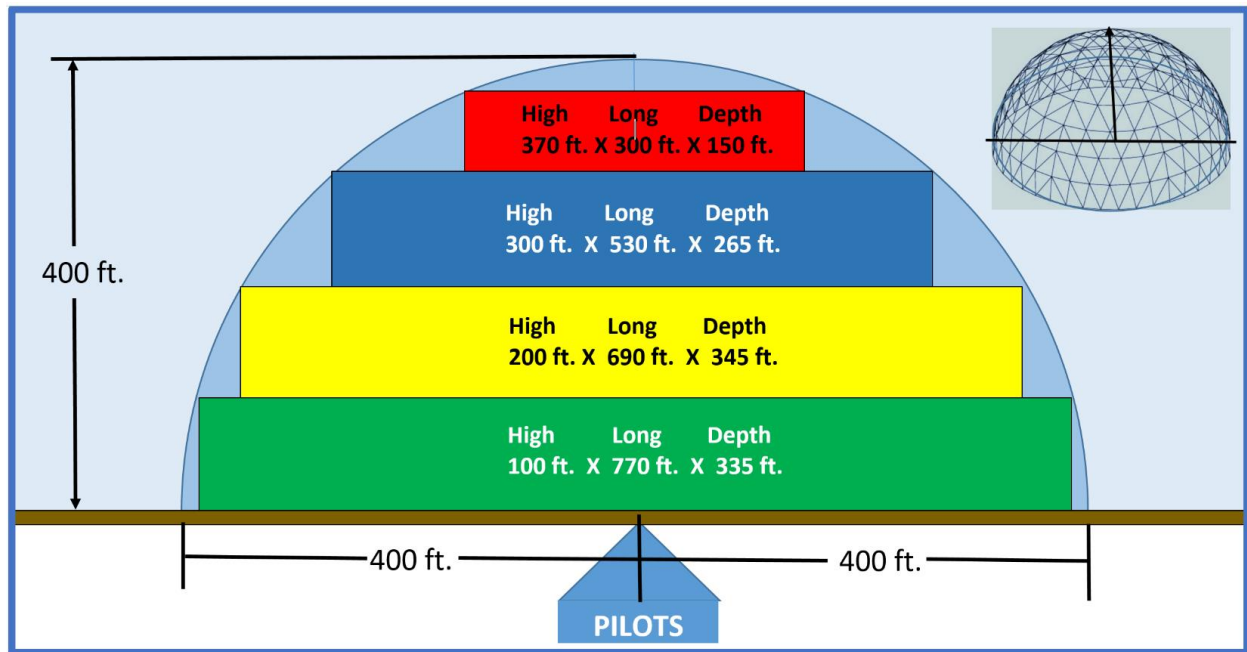
**If you're limited in time just read this summary paragraph and then decide if you need more details.** The NPRM for Limited-RID UAS has deeply concerning issues of safety resulting from operating in an unseen virtual containment that progressively gets smaller in altitude which limits the space to unsafe separations for flying multiple aircraft. Geo-fencing can be dangerously hazardous when an aircraft overflies a virtual fence and the operator no longer has control as a microcontroller chip is turning the UAS back into the dome space that may likely be into the flight path of other model aircraft. **All operators are required to have a GSC switch on their transmitter to deactivate geo-fencing if a collision is about to happen or when people or vehicles wonder into the flight area which is not uncommon. AMA RULES!**

**The Dome shape virtual geo-fenced encapsulation is only suitable for 2 lbs. or under model aircraft because the diameter gets progressively smaller at cruising altitudes**

After a thorough review of the NPRM Limited Remote-ID requirements, it was determined that the design and performance criteria that were proposed and factory limited to a 400 ft. radius flight area from the operator has safety and geo-fencing issues. The limited lateral and depth distances at cruising altitudes would only be somewhat safe for flying small slow-flying helicopters, multirotor drones, and fixed-wing airplanes in the backyard/park-flyer classification that weigh much less than a few pounds. This represents less than 10% of the model aircraft flown at AMA flying sites. The popular sized airplanes that are flown by 90% of AMA members could not be safely flown as Limited RID compliant aircraft in this dome containment.

**At a cruising altitude of 370 ft. the max diameter is 300 ft. and AMA safety rules require no flying behind yourself so the depth is 150 ft. which is unsafe especially for several /more UAS.**

As can be seen in the drawing that follows, an 800 ft. diameter on the ground reduces to a lateral flight distance of 300 ft. when flying at an average altitude of 370 ft. by virtue of the geo-fenced dome shape which progressively reduces the flight area as a model aircraft climbs to its cruising altitude. AMA clubs most often allow four model aircraft to fly at the same time. Since AMA safety rules require operators to fly only forward of a flight line and not in the back of themselves, the area for flying would be reduced to half a dome. The depth at the 370 ft. altitude is now only 150 ft. from the operator. These distances are at their maximum only near the center of the dome shape and reduce as the model aircraft is navigated away from the center and to higher altitudes. The operator would have to navigating a continuous turn within an invisible virtual dome.



Flying any model aircraft other than a hovering drone or helicopter in this compressed dome-shaped area with several other aircraft is likely to result in a collision with another model aircraft. The risk is also increased considerably because of the geo-fencing which takes control away from the operator anytime his aircraft crosses the virtual geo-fenced boundaries which he can't see. When this happens the onboard preprogrammed control unit activates a turnaround maneuver towards the center that could likely be into the flight path of another aircraft. The operator doesn't regain control until his aircraft senses its back in the permitted area and the additional delay time adds more to the risks of an accident that may involve people and property on the ground.

Narrowing the size of a flight area which the dome shaped boundary limit does as an aircraft climbs in altitude is inconsistent with all aircraft flying even full scale. When any aircraft climb to higher altitudes the lateral flight area increases not decreases since most of the flying and cruising takes place at the higher and safer altitudes allowing for more separation from other aircraft and recovery from maneuvers so as not to unduly create a safety hazard. The upside-down wedding cake where each layer gets wider as altitude increases is used to describe airspace classifications and demonstrates why a dome-shaped virtual containment area that gets smaller as altitude increases should never be considered except for hovering aircraft or for flying a single model aircraft for training purposes only.

**Geo-fencing presents dangerous safety issues that preclude it being used to contain any model-aircraft within invisible virtual boundaries:**

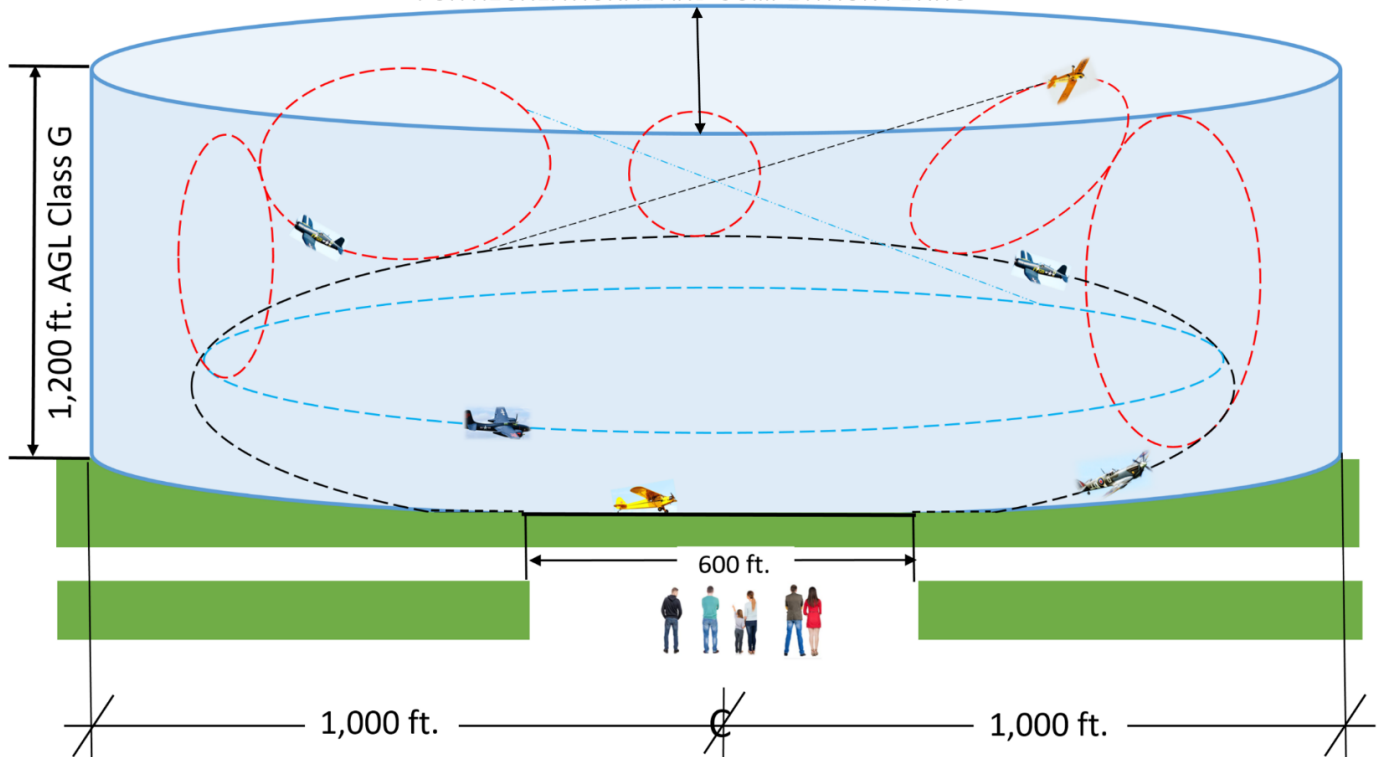
GPS receiver modules and a microcontroller have been used successfully to keep drones from taking off in restricted areas as well as not entering restricted areas. However, creating a permanent tamperproof factory geo-fenced in containment area that can't be deactivated is unacceptable. Geo-fencing has been used in trainer model airplanes and drones but only when the operator has the ability to immediately deactivate the inflight function with a switch on their transmitter. It is not uncommon for youngsters, adults, off-road vehicles, etc. to wonder/enter into a flying site area in an open field or at an event even when caution signs and areas are roped off. When that happens all model aircraft in flight climb to safer and higher altitudes beyond the flight area boundaries until the people or vehicles are removed from the site.

**Safety issues would prevent AMA clubs from allowing any Limited Remote-ID compliant UAS/model-aircraft from flying at FRIA sites.**

AMA club flying sites and runways are sized to accommodate the wide variety of model-aircraft flown by their members as can be seen in the drawing below. The sites are most often located in rural areas on open and unobstructed fields where members fly three or four model aircraft in a race car track flight path either clockwise or counterclockwise depending on the wind direction. This pattern of flying is followed in order to prevent aircraft from having a head-on collision while all maneuvers are entered into and exited in the direction of travel.

Limited Remote-ID aircraft confined to within a geo-fenced ½ dome-shaped flight area with a radius of 400 ft. could not be safely flown in the prescribed flight path with other model aircraft that are flown at lateral and depth distances limited by the line of site of the operator or club boundaries. Even if the 400 ft. geo-fencing were enlarged for a Limited Remote-ID aircraft it would have to be capable of being deactivated by the operator for emergency situations as described in the previous section. It would also have to allow the operator to alter via his transmitter the turnaround maneuver direction when a model aircraft does a controlled reentry into the permitted flight area after flying beyond a virtual geo-fenced boundary to prevent a head-on collision with oncoming aircraft.

**A TYPICAL AMA FLYING SITE CAPABLE OF ACCOMMODATING A VARIETY OF POPULAR MODEL AIRCRAFT FOR RECREATIONAL AND COMPETITION FLYING**



**Conclusion – Limited Remote-ID aircraft would be unsafe and unacceptable:**

It should be apparent after reading the previous sections in this comment that permanent factory set geo-fencing would be dangerously hazardous to utilize in any UAS/model-aircraft unless it was capable of being deactivated by the operators from their transmitters. And even then, it would only be useful in trainer aircraft flown under limited conditions where multiple aircraft were not flying. We believe it makes little sense to create a geo-fenced barrier and then tell the person that they have to

travel 30 miles or more to a FRIA site to fly when their own backyard or local schoolyard may be in Class G airspace.

**How did FAA come up with a 400 ft. radius range for Limited Remote-ID?** The FAA stated in the NPRM that they accepted the ARC recommendation of 400 ft. as a reasonable distance for law enforcement to visually associate a UAS with the location of its operator. All AMA outdoor flying sites have open and unobstructed flying areas where anyone including law enforcement can see the operators standing behind a flight line and associate them with their aircraft because all the aircraft are flown in front of the operators and within their visual line of sight. **An average size model-aircraft can be seen clearly at a distance of 1,200 ft.**

When drafting a rule of this type it's important that the persons involved have a basic knowledge of the minimum airspace requirements for popular model aircraft other than drones. We are surprised AMA wasn't contacted as we have been in the past and to check our safety programming instead of proposing an unsafe and potentially hazardous rule.

The cost to purchase a Standard Remote-ID aircraft as compared to a Limited-Remote-ID aircraft based on each having the same component requirements except for the broadcast transmitter should only be about \$100 more at retail than the Limited RID... so why would anyone not spend the extra amount not to be geo-fenced in range or limited to FRIA sites but fly within VLOS in any Class G airspace locations?

**As we have mentioned in previous comments, a one-size-fits-all approach** to rulemaking for distinctly different UAS/drones that are VTOL aircraft and fixed-wing model airplanes with different flight envelopes/characteristics doesn't work, and the flaws created in trying to do this with Limited Remote-ID proves this important point.

**We urge the FAA to eliminate geo-fencing** since it's much too dangerous for Limited Remote-ID or eliminate Limited RID since Standard RID won't cost that much more. Please consider once again to exempt all model aircraft and multi-rotor race drones that are not technology equipped for navigation beyond the visual line of sight of the operators and that are flown at FAA permitted flying sites. The cost and fees for compiling with network and broadcast equipment along with cellular and USS data handler fees are overly burdensome and unwarranted especially since this community presents no safety or security threats/risks. Flight data tracking for aircraft only allowed to be flown at designated flying sites because they lack the technology to fly BVLOS has no value in developing a UTM system.