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AMA D1 Technology Comments

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) that's responsible for developing safety programming for new and emerging technologies and their utilization in UAS/model-aircraft. I am deeply concerned with proposals in the FAA's NPRM for Remote-Identification (RID) that would negatively impact our existing community of responsible and safe model aircraft hobbyist.

We recognize and support the need for RID to be incorporated into certain UAS for commercial and/or recreational use. I believe FAA's technology choices for Standard and limited RID will align well to enhance the safety and security of commercial and recreational drone flight operations and for law enforcement to address the illegal and disruptive drone flying of those operators who may be clueless, careless and reckless.

Unfortunately, the proposed rules do not align well for model aircraft that don't utilize the advanced flights systems already incorporated in drones. Trying to apply rules that were developed for drones that utilize technologies allowing them to fly beyond visual line of sight (BVLOS) to model-aircraft that are only capable of flying within visual line of sight (VLOS) places unnecessary, overly complex, over-burdensome requirements on AMA's community of safe and responsible operators.

The NPRM lacks any safety or security risk assessment data to warrant proposing a Remote-ID technology requirement for model-aircraft that are only capable of VLOS flights and that are flown at permitted and designated sites. There are no valid reasons why the FAA has to have a blanket one-size-fits-all rule for recreational UAS operations since the FAA have established different sets of rules in different classes of airspace for different types of full-scale recreational aircraft such as paragliders, ultralights, hot-air balloons and sport aviation.

The NPRM would impose burdensome costs requirements on model-aircraft operators. It's a well-known fact that 95% of the drones operating today already incorporate the technologies necessary for RID compliance and that 90% of model-aircraft don't. No longer would traditional R/C systems be sold or could they be used in newly purchased UAS. The UAS and its ground control station (GCS) would have to be equipped with RID compliant integrated hardware modules/systems to broadcast and network tracking and identification data. A smartphone would be required to transmit the data via the internet to a USS data handler. The additional cost for RID integrated systems for one UAS is estimated at $250 over traditional R/C systems. The monthly costs and fees would average $50/mo. for the cellular service plans and USS data handling.

Although we are disappointed that the FAA decided not to accept the recommendation from its UAS RID Aviation Rule Committee to exempt UAS that operated in compliance with CFR part 101 by AMA members**,** I am asking the FAA to consider the following recommendations that may allow AMA members to comply with the NPRM at a much less burdensome cost and with reasonable operational requirements and limitations.

Proposed NPRM Technology Revisions to Foster Compliance and Lower Operator Cost Burdens

Technology Considerations Summary Recommendations: (Rationale and details follow)

1. Accept - NPRM for Standard RID UAS for all UAS that utilize advanced flight systems for BVLOS flights.
2. Revise - NPRM for Limited RID UAS to eliminate the dangerous geo-fenced virtual containment dome and utilize a nonintegrated UAS broadcast system instead.

3. Revise - NPRM for Limited RID UAS to utilize conventional R/C transmitters and receivers without having to be integrated with the UAS broadcast system or the GCS network system.
4. Revise - NPRM for Limited RID UAS with a functioning UAS broadcast system to not need a functioning GCS network system while flying at FRIA sites.
5. Revise - NPRM for Limited RID UAS to use both a functioning UAS broadcast system and GCS network system to fly at any FAA permitted or temporary waivered locations in uncontrolled and controlled airspace.

Technology Considerations

Commercial and Recreational UAS

1. Standard Remote-ID UAS should be required for all UAS that utilize advanced flight systems to navigate beyond the visual line of sight (BVLOS) of the operator.
UAS intended to be flown BVLOS of operator in uncontrolled airspace and in controlled airspace with FAA authorization or waivers. FAA RID compliant UAS with fully functional and integrated UAS-broadcast and GCS-network systems.

Recreational UAS

Limited RID UAS should be for all model-aircraft flown within visual line of sight (VLOS) of operators. Available with just a UAS broadcast system when only going to be flown at a FRIA site or available with both a UAS broadcast system and a GCS network system if going to be flown at any FAA permitted or temporary waivered locations. Note - RID compliant UAS with non-integrated R/C transmitter and receiver.

2. Limited RID UAS should eliminate the dangerous geo-fenced virtual containment dome and utilize a UAS broadcast system instead.

Rationale:

Danger/Hazards of Geo-Fencing

a) Geo-fencing has been determined to be only useful as a training aid and certainly not for containment in a 400 ft. radius dome that progressively decreases in diameter with altitude. At AMA flying sites four model-aircraft are allowed to be flown at the same time. If a UAS crosses an inviable virtual geo-fenced boundary, the GPS microcontroller activates a turnaround maneuver towards the center and in the limited diameter of the dome geo-fenced area at the cruising altitude that could likely be into the flight path of another UAS/model-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 with other UAS.

b) AMA's safety programming and risk mitigation prevents any geo-fencing from being used that is not capable of being deactivated by the operators GCS transmitter for the express reason that it isn't uncommon for youngsters, adults, and off road vehicles to wonder into a flying site area or at an events even when caution signs and areas are roped off. When this happens all UAS in flight climb to safer and higher altitudes beyond the flight area boundaries until the people or vehicles are removed from the area.

Why Limited RID UAS should also use a broadcast module

c) The broadcast system will not have to rely on having network connectivity especially where many flying sites are located in rural areas. The broadcast system provides for UAS tracking rather than just the GSC location and favors future UTM systems. Few operators would elect to purchase a Limited RID UAS with a range of 400 ft. radius and would pay extra for a Standard RID UAS. It's also highly unlikely that

AMA FRIA sites would allow geo-fenced UAS to be flown where other UAS would be flying at ranges limited to VLOS in the prescribed race car course flight pattern for safety separation.

d) Broadcast tracking in real-time to smartphones with systems like Trackimo that weigh only 1.4 ounces can be made to broadcast not just GPS location data but other required message elements. The units measure 1.5" square x 3/4"' thick and we currently use them to track and find lost drones. It would be a huge saving for operators to own one Limited RID UAS broadcast module that could be moved from one model aircraft to another and its serial number could be the operator's identifier instead of the UAS serial number.

3. Limited RID UAS should utilize conventional R/C transmitters and receivers without having to be integrated with the UAS broadcast system or the GCS network system.

Hobbyist were most disturb with not being able to use their conventional R/C systems in newly purchased model aircraft. Giving up some NPRM tamperproof and integration requirements would go a long way to fostering compliance. It also would allow broadcast modules to be moved from one model-aircraft to another.

Rationale:

UAS/model aircraft tamperproof systems would not be tamperproof

a) The reason why the NPRM wants tamperproof systems that will require fully integrated transmitters and receivers is to prevent any disabling of RID functionalities. Although compliant drones are fully hardware integrated they are not tamperproof since anyone could unscrew the body sections and remove the heart of the drone which is its flight controller and replace it with a user programmable flight controller. It will be even easier for model-aircraft RID functions to be disabled by unplugging the servos from the RID integrated module, remove the module, replace it with one of the millions of obsolete receivers and go fly the new model aircraft with an obsolete radio transmitter.

b) The FAA has to place a little more trust in the aeromodellers and FRIA clubs to ensure that non-integrated RID systems used with current transmitters and receivers for Limited RID UAS are not tampered with to disable RID functionality

Advantages of continuing to use our current R/C systems

c) A big part of being a hobbyist/modeler is the ala-carte practice of investigating options and choosing what hardware components you want in the final project. R/C aeromodellers should not be limited to choosing only R/C transmitters and receivers that are integrated with RID broadcast and network components when the non-integrated R/C systems they already own can utilize a separate broadcast module and GPS receiver to provide RID tracking and identification compliance.

d) The hobbyist should be able to use their current transmitters and receivers or choose to purchase a new integrated systems for any new model aircraft and not just for those purchased or built before the rules enactment. Not having to purchase new and more expensive integrated control system for new model aircraft will be a big savings for hobbyists and a benefit for many manufactures. The hobbyist should only need to decide which UAS broadcast system or GSC network system or both to use and base this on where he/she wants to fly either only at FRIA sites or other FAA authorized or waivered location.

e) The average R/C hobbyist owns $1,500 in R/C systems and the 200K hobbyist x $1,500 = $300 million dollars of R/C systems that should still be usable in newly purchased model aircraft. Handicap hobbyist have custom built transmitters some with single stick and foot operated controls and licensed HAMs build their radios. There are groups of modelers who only fly with vintage radios that are 25-50 years

old who would no longer be able to use their radios in new aircraft. Hobbyist usually purchase new R/C systems about every 7 years but may continue using their older radios for 10 or more years.

4. **Limited RID UAS with a functioning UAS broadcast system wouldn't need any network system if flown only at FRIA sites.**

   Rationale: UAS without advanced flight systems that are only capable of being navigated within VLOS and only at FRIA sites shouldn't need a GCS networking as long as the UAS has a functional broadcast system since the separation distance from the GCS and the UAS is fixed by the limited boundaries of the FRIA site creating no additional risks.

5. **Limited RID UAS with a functioning UAS broadcast system and GCS network system may fly at any FAA permitted or temporary waivered locations in uncontrolled and controlled airspace.**

   Rationale: The added redundancy to broadcast and network message elements makes it safe to fly UAS at FAA permitted and waivered locations rather than just at FRIA sites.

Operational Overview

Limited RID UAS used with a conventional R/C receiver and transmitter would still provide the RID compliance functions and not hamper remote tracking and identification as outlined in the following operational overview.

- Limited RID UAS would automatically start to broadcast message elements when the R/C receiver is powered on and stop when off. This could be done by powering the broadcast unit and the GPS with its microcontroller from the receiver's battery.

- The loss of a broadcast signal during flight would be recognized by the GSC RID app on the operators smartphone which will be programmed to provide an audio warning for the operator to "land as soon as practicable"

- The GSC network would start transmitting the message elements that were programmed into the RID app along with the GPS location from the operator's smartphone to the USS data handler when the operator selects the app's icon "start flight", and stop when the operator selects the app's icon "stop flight".

- If network connectivity is lost at the GSC the RID app on the operators smartphone will provide an audio message saying "internet connectivity lost". As long as the UAS is broadcasting the operator can continue the flight.

- Monitoring R/C system status and programming failsafe conditions are available from most conventional R/C systems. Hobbyist who operate the older R/C systems do pre-flight checks and are quite capable of determining the status of their model-aircraft and R/C systems before flying.