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July 25, 2014

SUBMITTED ELECTRONICALLY

Docket Operations, M-30  
U.S. Department of Transportation  
West Building Ground Floor, Room W12-140  
1200 New Jersey Avenue, SE  
Washington, DC 20590-0001

Re: Smith College and Other University Faculty  
Comment on FAA Notice of Interpretation  
FAA Docket No. FAA-2014-0396

Dear Sir or Madam:

We represent Smith College in connection with the submission of its enclosed written comments in response to the Federal Aviation Administration's Interpretation of the Special Rule for Model Aircraft, published June 25, 2014.

Smith College's comments are joined in support by faculty and administrator signatories from the sciences, engineering, biology, aerospace and other fields at Boston University, California University of Pennsylvania, Central Michigan University, Duke University, Five Colleges Consortium, Harvard University, Pennsylvania State University, Shippensburg University, Stanford University, St. Lawrence University, University at Albany SUNY, University of Redlands, University of Massachusetts Amherst, University of Michigan, and the University of Wisconsin.

We thank the Department for providing due consideration to these comments.

Respectfully submitted,



Brendan M. Schulman

BMS:rl  
Enclosure



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Submitted electronically to: [www.regulations.gov](http://www.regulations.gov)

**Re: FAA Interpretation of the Special Rule for Model Aircraft (Docket No. FAA–2014–0396)  
Comment by College and University Educators and Researchers**

To Whom It May Concern,

As educators and researchers, we write to express our collective concern about the *Interpretation of the Special Rule for Model Aircraft* (hereafter the *Interpretive Rule for Model Aircraft* or *Interpretive Rule*) published in the Federal Register on June 25, 2014. The Interpretive Rule addresses the critical issues of model aircraft safety and protection of our national airspace system. Perhaps inadvertently, this novel interpretation could also have serious and severely detrimental impacts on education and research in the United States, particularly in the areas of Science, Technology, Engineering, and Mathematics (STEM).

Model aircraft have been safely used in education and research since the earliest days of flight. The Wright Brothers used models to test their designs before putting their own lives at risk. Radio-controlled model aircraft, identical in many respects to today's devices, have been used in the United States since at least the 1930s. Some of our nation's top scientists, engineers, pilots, and astronauts furthered their careers experimenting with model aircraft, a list that includes John Glenn, Paul MacCready, Burt Rutan, Neil Armstrong, Robert Gibson, Arthur Young, Samuel Langley, Thomas Edison, William Stout, and numerous others. Model aircraft are ideal for developing and testing new designs that can improve the aerodynamic efficiency, flight dynamics, and safety of full-sized aircraft; with the availability of miniature cameras and other small sensors, these same models now make valuable contributions to environmental

science, GIS mapping, filmmaking, archaeology, agricultural science, and many other fields. As educators in STEM fields, we believe that free and open access to this technology is absolutely essential to our nation's continued leadership in aviation, to our future economy, and to our long-term security.

Perhaps surprisingly, model aircraft used in research and education have a safety record that appears to be unmatched by any other form of aviation. According to the Academy of Model Aeronautics (AMA), there have been six recorded fatalities involving model aircraft in our entire nation's history.<sup>1</sup> Nearly all of these incidents involved the operator or direct participants. No fatalities have ever been caused by small battery-powered models (e.g., "Park Flyer" models) and, to the best of our knowledge, no fatalities have resulted from academic research with model aircraft. It is difficult to identify any other high-value activity that occurs in the outdoor airspace and has such an extraordinary safety record. Even baseballs are statistically more deadly. Some of today's model aircraft are so small and safe that they can even be flown indoors around people and furniture.

We understand and share the FAA's concern about model aircraft being operated in places where they do not belong and creating a hazard to manned aircraft operations. Recent news reports suggest there have been model aircraft sightings by airline pilots in the vicinity of airports and in other highly objectionable locations. We firmly believe that our legal system should address these transgressions through both civil and criminal remedies as appropriate against anyone who maliciously or through wanton recklessness endangers the navigable airspace. Our long-standing use of model aircraft, however, bears no resemblance to the objectionable practices that have recently become such a concern. Overbroad regulatory interpretation, such as the one the FAA has issued, will serve only to chill and thwart responsible parties, such as our institutions, while doing little if anything to restrain those who actually could put the safety of the public at risk.

Given the exemplary safety record of academic model aircraft and their disproportional contribution to science and engineering, we have several serious concerns about the new interpretive rule including:

### *1. Unprecedented Expansion of FAA Jurisdiction*

The Interpretative Rule states that "the FAA intends to apply its enforcement authority to model aircraft operations that endanger the safety of the National Airspace System (NAS)." While federal statutes in place since 1926 grant the FAA authority to regulate the navigable airspace,<sup>2</sup> understood to be the airspace above approximately 500 feet altitude in most areas, the NAS is a term that the FAA now implies comprises all airspace in the United States, including our campuses, private backyards, and possibly even inside buildings. This

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<sup>1</sup> Personal communication with Richard Hanson, *Government and Regulatory Affairs Representative for the Academy of Model Aeronautics.*

<sup>2</sup> See 49 USC § 40103 (b)(1)

brehtaking jurisdictional expansion appears to conflict with long-standing expectations for privacy, property rights, and local control. It is notable that the navigable airspace in the United States was originally carved out of private property as an easement, that the Supreme Court has ruled decisively that landowners retain “exclusive control of the immediate reaches of the enveloping atmosphere”,<sup>3</sup> and that aerial intrusions into this space by the government require a warrant.<sup>4</sup> See Exhibit A. The Interpretive Rule for model aircraft patently disregards these long-standing precedents, regulating all airspace as if it were a public highway and placing onerous new restrictions on landowner activities, including in our case, research and education involving model aircraft.

## *2. Unreasonably Broad Definition of “Aircraft”*

The Interpretive Rule also vastly expands the conventional definition of “aircraft” to include, in a most literal sense, “any contrivance invented, used, or designed to navigate, or fly in, the air”. Objects the size of butterflies and even toys that are “used in the air” appear to be gaining the rights, regulatory obligations, and federal protections afforded to full-sized passenger aircraft. In dismissing the FAA’s first-ever fine of a model aircraft operator, Administrative Law Judge Patrick Geraghty stated that the FAA’s interpretation of the word aircraft would result “in the risible argument that a flight in the air of, e.g., a paper aircraft, or a toy balsa wood glider, could subject the “operator” to the regulatory provisions of FAA. Part 91, Section. 91.13(a).” Under this new paradigm, even common objects such as Frisbees and baseballs could be construed as “aircraft” that could potentially harm people and property on the ground. The newly expanded definition of “aircraft” brings unreasonable and unwarranted restrictions that substantially reduce the value of our campuses for teaching and research.

## *3. Unwarranted Distinction between Recreational and Commercial Model Aircraft*

The regulatory distinction between “recreational” and “commercial” use of model aircraft is troubling in that the FAA has not substantiated how this distinction promotes safety. It is concerning, for example, that a ten-year-old hobbyist can freely fly model aircraft for recreation, while our nation’s scientists, engineers, and entrepreneurs are prohibited from using the same technology in the same types of environments. The focus on restricting commercial use is also at odds with all previous FAA rules and advisories pertaining to other small airborne contrivances such as balloons, tethered balloons, kites, and even model aircraft.<sup>5</sup> None of these prior rules for unmanned contrivances distinguish between commercial and recreational use; rather they promote safe use by providing unambiguous weight and altitude limits. The current fixation with restricting the commercial use of model aircraft gives the unfortunate impression that the FAA may be protecting vested interests, including pilots’

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<sup>3</sup> United States v. Causby, 1946

<sup>4</sup> Florida v. Riley, 1989; California v. Ciriolo, 1986

<sup>5</sup> See for example CFR 101.1 and Advisory Circular 91-57.

unions and established aircraft manufacturers, from competition arising from innovative new technologies.<sup>6</sup>

#### *4. Absence of Stakeholder Participation in the Rulemaking Process*

Due to the highly technical nature of aviation, the FAA rulemaking typically relies on industry and government experts, with little direct involvement of the public. The regulation of model aircraft, however, presents an entirely different situation. These devices are designed to be used near the ground and are often intimately associated with the use and enjoyment of the land. Historically, they have been employed by experts and laypersons alike for recreational, academic, and commercial purposes. Major stakeholders include educators, researchers, filmmakers, journalists, farmers, innovators, entrepreneurs, small businesses, hobbyists, privacy advocates, municipalities, and landowners across the United States, to name a few. None of these stakeholder groups appear to have adequate representation within the FAA rulemaking process (Exhibit B) or within the Congressional legislative process that created the legal foundation for these rules.<sup>7</sup> This lack of representation is concerning and needs to be rectified before restrictive new rules are promulgated for the near-ground space where we live, work, and play.

#### *5. Conflicts with Institutional Safety Policies and Municipal Ordinances*

The Interpretive Rule for Model Aircraft, with its expansive view of public airspace, appears to infringe on the right of landowners to exclude or otherwise control recreational model aircraft on their property. Many of our institutions have safety policies that limit model aircraft to certain parts of campus, require faculty oversight, and prescribe conservative limits on weight, altitude, and speed. Presumably if these model aircraft are now deemed to be operating in the public national airspace system, rather than on institutional property, our safety policies could be readily circumvented. Under current laws and regulations, model aircraft can weigh up to 55 pounds, fly at speeds well over 100 mph, and be operated by hobbyists of any age. They can also carry high-definition cameras that upload images on the internet for worldwide distribution. It is therefore more important than ever that landowners, whether they be individuals, institutions, or municipalities, continue to have jurisdiction of the airspace near the ground.

For all of the above reasons, we believe that the Interpretive Rule for Model Aircraft is ambiguous and unreasonable. It is not even clear, for example, what constitutes a model aircraft. Would a balsawood glider, designed by engineering students and tossed on a lawn,

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<sup>6</sup> The Interpretive Rule for Model Aircraft goes even further, stating in footnote 4 that “The FAA has also addressed recreational use of aircraft by pilots in the Sport and Recreational Pilot Certificate rules, which prohibit those pilots from acting as pilot in command of an airplane carrying passengers or property for compensation or hire, or in furtherance of a business.” This footnote implies that researchers in numerous academic disciplines, especially in engineering and aeronautics, may effectively be banned from participating in model aviation as a hobby. This would represent an extraordinary level of government involvement in the private lives of US citizens.

<sup>7</sup> FAA Modernization and Reform Act of 2012, PL 112-95.

qualify as model aircraft worthy of FAA regulation? Would our safety officer really need to notify all airports within five statute miles? Could our students and faculty continue to have a model aviation club, or would this be a commercial activity since tuition is being paid? If a student designs a novel Frisbee and it flies into a public road, does this now warrant an NTSB investigation? Would a new sport violate FAA rules if it utilized an object that “flies in air” and “could injure people on the ground”?

These ambiguities in the regulatory definition of an aircraft are compounded by the lack of clarity on the extent of public airspace and FAA authority. In letters to several operators of a small model aircraft (Exhibit C), the FAA’s UAS Aviation Safety Specialist wrote “Private land owners do not have any jurisdiction over the airspace above their property and cannot prohibit or allow aviation operations over their land.” While this notion may be perfectly reasonable for manned aircraft flying hundreds of feet above our homes, it is another matter entirely when “aviation operations” refer to toy-size contraptions hovering a few feet above the grass. The FAA’s recent \$10,000 civil fine for a Styrofoam model airplane flown “under an elevated pedestrian walkway” even raises the possibility that federal aviation regulations for passenger aircraft could be applicable inside our buildings and research labs.

If the FAA actually interprets its jurisdiction to include all airspace in the United States, and its statutory mandate to protect persons and property from all contrivances “used in the air”, then model aircraft are only one of many hazards that will need to be addressed through regulation. Other serious threats to low-flying aircraft and people on the ground include bullets, fireworks, model rockets, golf balls, baseballs, children’s kites, and possibly even thrown stones. To ignore the very real dangers from these other airborne hazards, while focusing regulations exclusively on model airplanes, appears to be arbitrary and capricious. There is no evidence that small model aircraft being used responsibly in the immediate reaches of the airspace pose any undue hazard to aviation operations or to persons on the ground. Furthermore, numerous existing laws, governing reckless endangerment, nuisance, trespass, and privacy, have proven highly effective for limiting objectionable uses of the lowermost airspace.

In conclusion, we ask that the FAA to take the following actions:

1. Immediately suspend implementation of the Interpretive Rule for Model Aircraft.
2. Focus FAA rulemaking and enforcement efforts on persons who endanger manned aircraft by recklessly or maliciously operating model aircraft in the navigable airspace.
3. Introduce a new section in 14 CFR Section 101 (MOORED BALLOONS, KITES, AMATEUR ROCKETS AND UNMANNED FREE BALLOONS) that sets reasonable limits for MODEL AIRCRAFT based on straightforward parameters such as altitude, weight, and cruising speed. As is done for balloons, kites, and model rockets, the FAA should establish exemptions for small and lightweight model aircraft used responsibly at low altitudes and implicitly in accordance with local laws and landowner permissions. Larger and more hazardous models should be subject to

oversight from a Community Based Organization (CBO) such as the Academy of Model Aeronautics or a new academic CBO established by a consortium of Colleges and Universities.

4. In all future rulemaking pertaining to model aircraft, unmanned aircraft, and other low-flying contrivances, the FAA should respect the well-established precedent that the immediate reaches of the airspace are vested in the landowner and are therefore not considered a public highway for aviation.

We are aware that the FAA is under extraordinary pressure from many interest groups to regulate and otherwise control the lowermost reaches of the airspace for commercial use. We sincerely appreciate your thoughtful attention to our concerns and look forward to working closely with your agency to craft sensible regulations for model aircraft that promote safety, encourage innovation, and respect legal precedent.

Respectfully,



Paul Voss, Ph.D.  
Associate Professor, Picker Engineering Program  
Smith College

Joined in support by, listed alphabetically:

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University of Michigan, Ann Arbor

cc: Ruth Constantine  
Joseph O'Rourke  
Laurie Fenlason  
Laura Smiarowski

## **Exhibit A**

**Excerpts from the landmark Supreme Court case on airspace rights.**

United States v. Causby

328 U.S. 256 (1946)

“We have said that the airspace is a public highway. Yet it is obvious that if the landowner is to have full enjoyment of the land, he must have exclusive control of the immediate reaches of the enveloping atmosphere. Otherwise buildings could not be erected, trees could not be planted, and even fences could not be run. The principle is recognized when the law gives a remedy in case overhanging structures are erected on adjoining land. The landowner owns at least as much of the space above the ground as he can occupy or use in connection with the land. The fact that he does not occupy it in a physical sense-by the erection of buildings and the like-is not material. As we have said, the flight of airplanes, which skim the surface but do not touch it, is as much an appropriation of the use of the land as a more conventional entry upon it.”

...

“If [the regulating] agency prescribed 83 feet as the minimum safe altitude, then we would have presented the question of the validity of the regulation.”

## Exhibit B

### FAA Advisory and Rulemaking Committee for Unmanned Aircraft (2014)

#### UAS ARC MEMBER ORGANIZATIONS

- General Atomics
- MITRE
- GE
- New Mexico State University \*
- Raytheon
- National Business Aviation Association (NBAA)
- Northrop Grumman
- Insitu/Boeing
- Rockwell-Collins
- Honeywell
- PBFA
- DHS CBP
- ALPA
- AOPA
- AUVSI
- NASA
- AeroVironment
- Lockheed Martin

\* New Mexico State University appears to represent the broad interest of the academic community, however, their presence on the ARC is through the Physical Science Laboratory (PSL). The PSL website states that the organization “performs a wide variety of research, testing and validation for the Department of Defense and other Federal government departments and agencies and is widely known as an expert agency in the field of unmanned aircraft systems.”

## Exhibit C

Cease-and-desist letter detailing the FAA's expansive new interpretation of public airspace.



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

**MAY 16 2013**

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

Reed Timmer  
Tornado Videos.net/TVNWeather  
4060 Nicole Pl  
Norman OK 73072

Dear Mr. Timmer,

Our office recently became aware of your web site, [www.tornadovideos.net](http://www.tornadovideos.net) advertising the use of a quadcopter or Unmanned Aircraft System (UAS) for the civil and commercial purposes of selling videos and conducting tornado research.

The Federal Aviation Administration (FAA) has the requirement for the regulation and safe operation of the National Airspace System which covers all navigable airspace in the US. Private land owners do not have any jurisdiction over the airspace above their property and cannot prohibit or allow aviation operations over their land. Unmanned Aircraft are unable to comply with Title 14, Code of Federal Regulations (14 CFR) and need a specific FAA authorization. The purpose of this letter is to inform you the FAA has taken steps to ensure the public safety regarding all UAS operations. Currently, the FAA authorizes UAS operations by three means:

1. Certificate of Authorization (COA)

This authorization is an approved exemption that allows recognized public entities, i.e. federal, state, and municipal government related agencies and organizations, to self-certify their aircraft and conduct operations in accordance with the certificate after approval. The FAA reviews the operation to ensure it is in the public interest, safe, is operated by only the proponent, and does not significantly impact the safety of other air traffic or persons on the ground. To issue a COA normally takes about 60 business days once the proponent completes application and verifies its status as a public entity.

2. Special Authorization Certificate in the Experimental Category

For civil operators, the FAA can issue an experimental aircraft certificate in accordance with 14 CFR Part 21. This allows for testing and development of the aircraft, market development, and training of pilots and crewmembers for prospective clients.

3. Advisory Circular 91-57 for Recreational hobbyists

Those who use UAS only for recreational enjoyment and not for compensation or hire, operate in accordance with Advisory Circular (AC) 91-57. This generally applies to operations in remotely populated areas away from airports, persons and buildings, below 400 feet Above Ground Level, and within visual line of sight. The FAA recognizes that people and companies other than modelers might be flying UAS with the mistaken understanding that they are legally operating under the authority of AC 91-57. AC 91-57 only applies to modelers, and thus specifically excludes its use by persons or companies for business or research purposes.

The three means of UAS operations above are necessary due to the technical pace of UAS development and the proliferation of aircraft in our National Airspace System. UAS use has grown exponentially and most are not certified, manufactured, or maintained to the standards of manned aircraft. As a result, the FAA has put guidelines into effect to ensure public safety. Similarly, most wishing to operate UASs are not pilot trained, certified, or familiar with the Code of Federal Regulations to ensure the safety of others. While the FAA currently does not allow any UAS operation to be conducted for commercial purposes, the liability implications of such operations without authorization could be devastating to the person operating the UAS should an unfortunate accident occur.

It appears, based on your website, that you are currently using UAS without proper authorization and for civil or commercial purposes. This is in violation of FAA guidance for UAS. If this is true, I must advise you to cease operations until you have the proper authorization and safety is ensured. Proper authorization as a public entity can be obtained with a COA. If you are not certified to conduct public operations, you would be required to operate under the second option described above. The petition to 14 CFR Section 21.191 and the petition to 14 CFR Section 91.319 are not easily granted, you may go completely through the process and not receive the experimental certificate or the exemption. Also, please be advised that the application for an experimental certificate will require technical diagrams of your aircraft and radio control equipment. The experimental certificate application process is spelled out in FAA Order 8130.34B. If you have any additional questions about the Special Airworthiness Certificate or petition process, please contact Thomas Rampulla at [thomas.rampulla@faa.gov](mailto:thomas.rampulla@faa.gov).

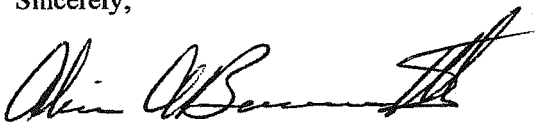
More information regarding UAS program use can be found at the following websites:

- [www.faa.gov/about/initiatives/uas/](http://www.faa.gov/about/initiatives/uas/)
- [www.faa.gov/about/initiatives/uas/reg/](http://www.faa.gov/about/initiatives/uas/reg/)

The FAA is working diligently to incorporate UAS into the National Airspace (NAS) and has been directed by Congress to integrate UAS by September 2015. For your safety and the safety of others, we require you to cease UAS operations as indicated by your website.

Please contact Alvin Brunner, UAS Aviation Safety Inspector, at 817-222-5246 with any questions during normal business hours.

Sincerely,



Alvin A. Brunner III  
Aviation Safety Inspector