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**PUBLIC  
INTEREST  
COMMENT**

## REGISTRATION AND MARKING REQUIREMENTS FOR SMALL UNMANNED AIRCRAFT

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### INTRODUCTION

The Federal Aviation Administration (FAA) has issued an interim final rule creating a new electronic registration system for unmanned aircraft systems (UAS) and requiring, for the first time, the registration of model aircraft operators. This comment highlights an omission in the agency's alternative scenario analysis, questions some of the purported benefits of the rule, and points out some of the continuing legal shortcomings associated with the FAA's approach. While we support the advent of a simple and streamlined registration system, we object to the extension of the registration requirement to model aircraft operators.

The Technology Policy Program of the Mercatus Center at George Mason University is dedicated to advancing knowledge of the impact of regulation on society. It conducts careful and independent analyses employing contemporary economic scholarship to assess rulemaking proposals from the perspective of the public interest. As such, this comment on the FAA's

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interim final registration and marking requirements for small unmanned aircraft does not represent the views of any particular affected party or special interest group but is designed to assist the administration as it carries out Congress’s mandate to safely, efficiently, and legally integrate UASs into the National Airspace System.

## PROBLEMS WITH THE REGULATORY EVALUATION

1. The agency fails to consider all regulatory alternatives.

The FAA’s regulatory evaluation of its interim final rule (IFR) is inadequate in many crucial respects. First and most importantly, it does not fulfill the agency’s obligation, under Executive Order 12866, to “assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating.” In particular, the agency ignores the alternative of proceeding with its new electronic registration scheme for drones, but continuing to exempt model aircraft operators from the registration requirement.

This omission is conspicuous. The agency evaluates the benefits and costs of its IFR, of the status quo paper-based registration system, and of an alternative that is paper-based but also imposes a new registration burden on model aircraft operators. There are two parameters that the FAA appears to be considering at the same time: 1) whether to create a new, electronic registration scheme for UAS, and 2) whether to require model aircraft operators to register. These two parameters can be visualized in a 2x2 matrix (table 1), producing four possible alternatives, of which the FAA evaluates three. Yet it is the fourth alternative—in which a new electronic registration scheme is developed, yet without any new burdens on model aircraft operators—that by the FAA’s own estimates has the lowest quantifiable costs.

TABLE 1. REGISTRATION PARAMETERS MATRIX

	Model aircraft operators must register	Model aircraft operators continue to be exempt from registration requirements
Paper-based registration	FAA’s rejected alternative	Status quo
Electronic registration for UAS	IFR	Conspicuously missing from the regulatory evaluation

Source: Authors’ summary of FAA regulatory evaluation. Federal Aviation Administration, “Interim Final Rule Regulatory Evaluation—Registration and Marking Requirements for Small Unmanned Aircraft,” December 16, 2015.

Quantitative cost estimates for the omitted alternative can easily be derived from the FAA’s own analysis of the other three alternatives. Using table 9 of the regulatory evaluation and subtracting the modeler costs from total costs, we estimate the total and discounted costs of the alternative scenario as follows in table 2:

**TABLE 2. WEB-BASED REGISTRATION COSTS SUMMARY**

Year	Total Costs (\$M)	7% P.V.
2015	3.9	3.9
2016	5.9	5.5
2017	7.7	6.7
2018	10.5	8.6
2019	10.3	7.9
2020	10.2	7.3
<b>Total</b>	<b>48.5</b>	<b>39.8</b>

Source: Authors' calculations based on table 9 of FAA regulatory evaluation.

For our estimate, we assume that 100 percent of the system costs associated with electronic registry continue to be necessary, despite the lower quantity of registrants. Our estimate, therefore, is quite conservative. Shown in table 3, the total discounted cost of the omitted alternative compares favorably with that of the other alternatives:

**TABLE 3. REGISTRATION COST MATRIX**

	Model aircraft operators must register	Model aircraft operators continue to be exempt from registration requirements
Paper-based registration	\$627.3 million	\$305.1 million
Electronic registration for UAS	\$45.7 million	\$39.8 million

Source: FAA regulatory evaluation and authors' calculations.

To fulfill its obligation under the law, we expect the FAA to fully evaluate this alternative without prejudice.

Having reviewed the outpouring of public comments regarding UAS registration, it is that clear that model UAS registration is the most controversial element of 14 C.F.R. part 48. Instead of conducting an evaluation of the necessity of this controversial element, the FAA has structured its analysis so that the cost saved by modernizing 14 C.F.R. part 47 registration for nonmodel UAS is doing all the work. The agency's only nod to the model UAS registration controversy is to adopt an alternative scenario in which model aircraft operators have to register using an archaic paper-based system.<sup>1</sup> To fulfill both the letter and spirit of regulatory evaluation requirements, the FAA must consider the alternative of creating a new electronic registration system while preserving the exemption for model aircraft operators.

1. The IFR evaluation technique is problematic insofar as it can be modified to justify any conceivable registration method. For instance, the evaluation could have similarly justified instituting the paper-based system by comparing it favorably to an even more costly stone-and-chisel-based system. In either case, the question "do the benefits of consumer UAS registration outweigh the costs?" remains completely unaddressed.

2. The cited benefits of model UAS operator registration are low.

The only quantitative benefit that the FAA cites for the IFR is the cost savings versus the paper-based system of registration currently in place. Since this is on the cost side of the ledger already, it is important not to double-count the cost savings as a benefit. Therefore, the FAA has in actuality posited zero quantitative benefits of small UAS (sUAS) registration. As we argue above, the cost is lowest in the alternative in which model aircraft continue not to have to register, and therefore, by the FAA's reckoning, this is the alternative in which the quantitative benefits are the highest.

In addition to the lack of genuine quantitative benefits, the FAA posits several kinds of unmeasurable qualitative benefits associated with mandatory sUAS registration. Qualitative benefits are benefits nonetheless, and we do not object in principle to them being counted as such. However, the qualitative benefits cited by the FAA remain somewhat dubious. The agency argues that registration will have two primary qualitative benefits: improving the liability and enforcement system for UAS and aiding the agency's education efforts.

The argument that mandatory registration will internalize safety externalities by improving liability and enforcement rests on the assumption that owners of drones involved in accidents are difficult to identify. The IFR states: "Taking enforcement action requires identifying an individual or entity responsible for the operation. That is often difficult due to the nature of sUAS operations." Yet in the vast majority of instances, owners of downed sUASs are readily identified even without a registration system in place. The FAA requested information from various law enforcement agencies and notes: "We received feedback that the majority of incidents do not require extensive amounts of time to track down sUAS owners, as they are normally with the sUAS or self-identify if the device crashes." Only in "a very limited number of incidents" did the owner not try to retrieve the crashed sUAS. Therefore, the qualitative benefits of this additional enforcement capability are inescapably "very limited" as well.

In addition, throughout the docket the FAA warns of the danger of sUAS by citing incidents in which the aircraft didn't crash. For example, it cites an instance in which a drone flew within a quarter of a mile of a commercial jet between eight and thirteen miles away from Newark Liberty Airport, at an altitude between 2,000 and 3,000 feet. Registration is useless for improving enforcement against these sorts of incidents. Reading a drone's serial or registration number at that height and speed is likely impossible. There is also the possibility that such deliberate lawbreakers would not comply with the registration requirement in the first place. In no way is the FAA's registration requirement likely to improve accountability for this kind of incident.

Mandatory registration will not meaningfully improve the accountability of operators either of drones that crash (who are likely to be identified even without a registry) or of drones operating dangerously that do not crash (which will remain difficult to identify). Consequently, the weight of evidence shows that mandatory registration will not serve to correct any market failure owing to limited accountability.

In addition to accountability concerns, the FAA cites as a qualitative benefit two separate aspects of user education that may be enabled through the registration system. First, the agency plans to present basic safety information to users who attempt to register and require them to acknowledge the information to proceed. Second, the agency expresses the possibility of using the information in the registry to conduct further educational outreach.

Will presenting basic safety information at the time of registration increase UAS safety? The five minutes that the FAA estimates it will take to register a noncommercial UAS operator “includes the time necessary to read the education materials that will be provided through the online registration system.” It additionally says that “each registrant will need to acknowledge having read, and state their intent to follow, guidance presented on a single screen of information before completing their registration process.” While we support educational efforts as an alternative to UAS regulation, we find it doubtful that inserting a single screen between eager hobbyists and their desire to fly their new toys will result in close reading of the safety information presented. Nor is it likely to produce much additional safety. It cannot possibly compare against the millions of dollars in added costs associated with requiring hobbyists to register.

The FAA also says that it intends to use the registry to target their educational efforts on an ongoing basis. These still-hypothetical efforts need their own benefit-cost analysis before we can even be sure that they are net benefits. The mere option value that the registry provides necessarily is a small fraction of whatever net benefits are ultimately calculated. Again, the alleged benefit is not even on the order of the relevant costs.

In addition, we believe the FAA’s educational efforts are already well served through other means, such as the agency’s new B4UFLY smartphone application, as well as private-sector informational applications such as AirMap. Consequently, we strongly discount the FAA’s claims that the registry will produce educational benefits.

### 3. The qualitative costs of model UAS operator registration are likely substantial.

The FAA estimates the quantitative costs of three alternatives, and it discusses some hypothetical qualitative benefits—but it does not consider any qualitative costs. While estimating the qualitative costs of the new registration requirement for modelers can be challenging, two such costs are likely substantial enough to warrant further investigation: The disincentive effect of charging a fee, and the privacy implications of having a public-record registration database of UAS owners.

*The effect of fees on compliance with registration requirements.* In the IFR regulatory evaluation, the FAA acknowledges that “fees and transfers can create incentives for behavior change,” yet the agency makes no attempt to quantify these behavior changes. We believe the disincentive effect of charging a fee of any size may be quite large. We have two reasons for this belief. First, a large number of public comments express concern a fee will dissuade UAS uptake and registration compliance. Second, the final report of the Recommendation Task Force advises for similar reasons that registration be free or equal to the *de minimis* rate of \$0.001, should

a fee be required by statute. Research from behavioral economics suggests that even the *de minimis* rate may be too high, as a price of “zero” appears to have special properties. That is, offering goods or services for free generates significantly different behavior than when a payment process is required, even while holding objective transaction costs constant.<sup>2</sup>

At present it costs modelers \$5 to register, with renewal every three years. The fee is designed to help cover the system costs of setting up and administering the registry. Nonetheless, the estimates contained in the IFR suggest that system costs per registration will only be near \$5 in the first two years, falling thereafter to less than \$1 per registration. Shown in table 4, this is evidence the FAA can afford to reduce or eliminate the registration fee.

**TABLE 4. REGISTRATIONS AND SYSTEM COSTS, 2015–2020**

Year	Registrations (000s)	System Costs (\$M)	System Costs per Registration (\$)
2015	979	3.9	4.0
2016	888	5.0	5.6
2017	2,891	3.2	1.1
2018	3,534	3.4	1.0
2019	3,384	3.0	0.9
2020	3,666	2.6	0.7

Source: Authors' calculations based on tables 2 and 9 of the FAA regulatory evaluation.

*Privacy costs.* In the near future the UAS registry will allow queries using an operator’s unique identifier to return name and home address information. This is in keeping with 14 C.F.R. part 48, which makes aircraft registrations part of the public record. While the registry is unlikely to be fully searchable (i.e., by every variable), nonetheless it will likely be easy for a web scraper to extract the full data set and ultimately convert it into a fully searchable form. This creates an intrinsic privacy concern for consumers and commercial operators alike, in addition to the tangible harm it may have on compliance. Even though these costs are likely unavoidable under current law, they are owed a careful consideration, if not estimation, by the FAA.

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2. For example, one set of experimental results indicate “individuals seem to act as if pricing a good as free not only decreases its cost, but also adds to its benefits.” Dan Ariely and Krsitina Shampner, “How Small is Zero Price? The True Value of Free Products” (FRB of Boston Working Paper No. 06-16, Federal Reserve Bank of Boston, Boston, MA, October 2006).

## EXPANSION OF THE REGISTRATION REQUIREMENT REMAINS ILLEGAL UNDER SECTION 336 OF FMRA

As we noted in our previous comment, section 336 of the FAA Modernization and Reform Act (FMRA) provides that “notwithstanding any other provision of law relating to the incorporation of unmanned aircraft systems into Federal Aviation Administration plans and policies . . . the Administrator of the Federal Aviation Administration may not promulgate any rule or regulation regarding a model aircraft” as long as certain conditions are met by those aircraft.

In response, the FAA argued that, “While section 336 bars the FAA from promulgating new rules or regulations that apply only to model aircraft, the prohibition against future rulemaking is not a complete bar on rulemaking and does not exempt model aircraft from complying with existing statutory and regulatory requirements. As previously addressed, Public Law 112-95 identifies model aircraft as aircraft and as such, the existing statutory aircraft registration requirements implemented by part 47 apply.”

We agree with the FAA that “the prohibition against future rulemaking is not a complete bar on rulemaking.” Instead, our position is that although the FAA may have authority to require non-commercial UAS operators to register their aircraft, it most certainly does not have authority to do so *in the context of its plans and policies relating to its required integration of UAS into the airspace under FMRA*. We reject the FAA’s interpretation that section 336 only bars new rules that apply only to model aircraft. Congress clearly intended that FMRA not be used as a pretext to diminish the freedom from regulatory burdens that modelers have heretofore enjoyed. Both that intent and the plain language of the statute contradict the FAA’s interpretation.

Moreover, while the FAA has existing authority to register aircraft, 14 C.F.R. part 48 requires registration of drone *operators* effective December 21, 2015. Registration of operators has no basis in existing law, underscoring the IFR as a new regulation regarding model aircraft. The authority to register aircraft comes from 49 U.S. Code § 44103, which states:

On application of the owner of an aircraft that meets the requirements of section 44102 of this title, the Administrator of the Federal Aviation Administration shall—  
(A) register the aircraft; and (B) issue a certificate of registration to its owner.

Thus not only does the U.S. Code clearly refer to registration of aircraft, not persons, it also removes any doubt by separately referring to the owner as the recipient of the registration certificate. The FAA has long maintained that it is not in violation of section 336, claiming it has always been at its discretion to exercise existing statutory registration requirements on model aircraft. Nonetheless, whatever the practical merits of operator registration, the IFR does not merely extend enforcement of existing rules to unmanned aircraft.

## CONCLUSION

To fulfill its obligations under Executive Order 12866, the FAA must evaluate a scenario in which electronic registration is used for non-model UAS and no registration is required of

model UAS. Such a scenario has lower quantitative and qualitative costs than the IFR. In addition, the qualitative benefits the FAA uses to support the IFR are questionable, and therefore, any marginal benefits of extending the registration requirement to modelers are small. For these reasons, a comprehensive benefit-cost analysis, which properly considers the alternative of creating a new electronic registration scheme without imposing new burdens on model aircraft operators, would reject a requirement for model aircraft operators to register with the FAA. We also continue to believe that mandatory model UAS operator registration violates section 336 of FMRA.