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REINING IN THE RENEGADES

THE U.S. FEDERAL AVIATION ADMINISTRATION

(FAA) must change its regulatory approach to small unmanned aircraft, which are rapidly populating the skies, outpacing the FAA's unravelling capacity to enforce its ban on their use in commercial applications. It must move away from its preoccupation with fixed-wing, military style drones like those recently approved for operation in Alaska, and shift its attention to the vehicles posing the greatest threat: small unmanned aircraft (microdrones) that are being bought by the hundreds or thousands on Amazon and other e-commerce sites for less than a thousand dollars.

Anyone can buy one and have it delivered the next day, ready to capture high-definition video and stream it back to the drone operator (DROP). Their utility in capturing news, supporting law enforcement, selling real estate, and patrolling pipelines and power lines for defects is obvious, and you don't really need a pilot's license to fly them — even though the FAA says only certificated pilots can fly them for commercial purposes *legally*. Real estate agents, aerial photographers, and surveyors are rushing to buy them, defying the FAA's position that flying them is illegal. Police departments, TV producers, and utilities are whetting their appetites.

In early July, we filed, through the small company we founded and run — Modovolate Aviation, LLC — a formal petition for rulemaking, asking the FAA to regulate microdrones for what they are: consumer products, operated by ordinary people with no connection to the aviation community. We also applied for a special airworthiness certificate to do testing, demonstration, and training with a \$5,000 microdrone we are building. To do so, we had to fill out a form with some 50 questions, and then — after a delay of four months — received an email suspending processing until we provided subsystem details more suited for certification of a 787 than a small, mostly off-the-shelf microdrone.

We propose that the FAA imitate the Consumer Product Safety Commission (CPSC), the Federal Communications Commission (FCC), and the National Highway Traffic Safety Administration, by prohibiting the sale and distribution of microdrones unless they have built-in technologies that make them law-abiding.

No one should be able to sell them unless they are incapable of flying higher than 400 feet above ground level (AGL), operating more than 1,500 feet from the operator, flying into class B, C, or D airspace, or within two miles of other airports.

Our proposal for creating relatively wide open spaces for law-abiding drones would accelerate opportunities for commercial operators who want

to exploit the stunning capabilities of these new technologies while obeying the law. It will also put the FAA in the forefront of performance-based regulation — a 21st-century approach to ensuring the safety of air commerce recently embraced by the British Civil Aviation Authority.

Some form of regulation of drones is necessary. A 787 flight crew responsible for 300 passengers shouldn't encounter a microdrone on final approach. A police or news helicopter pilot shouldn't have to compete with small aviation outlaws for access to the skies over a fire or an active shooter scene. And you don't have to be a helicopter pilot to worry; it would hurt like hell if a 12-pound bowling ball hit you on the head. Some microdrones weigh more than that.

The FAA will never marshal enough resources to detect every microdrone impulse buyer flying in his backyard or nearby baseball field. The FAA must focus its scarce resources on the handful of sales and distribution points rather than on thousands of anonymous operators.

The distinction between model aircraft flown for hobbyist purposes and microdrones flown for commercial purposes is not useful or sustainable. Much of the risk and many of the reported incidents result from hobbyists flying "recreationally" far beyond their line of sight and at distances far exceeding the consensus height limit of 400 feet AGL.

There's no need to license DROPs like aircraft pilots. Nor is there a need for hundreds of pages of detailed regulations prescribing flight altitudes, routes of flight, and human radio communication with air traffic controllers. Whatever limitations are appropriate to ensure safety can be built into the microdrones themselves. They can be law-abiding when they come out of the box. Technology will constrain them.

Microdrones already know how to do this. They can take off, hover, fly a GPS-defined grid, and return to their launching point autonomously. They can be programmed not to exceed particular heights above the ground and to stay within a certain radius of their DROPs.

Such autonomy, under a sensible regulatory approach, can be embedded in firmware and made extremely difficult for anyone to override. This is the only approach that will permit this new technological revolution to be channeled in a useful and safe direction. We all need it soon.

Technology creates risks, but it also provides a means to enforce the rules that reduce the risk. The FAA should recognize this. It should embrace the technology that can make its job easier — and make all of us safer.

