Drone Rules

Drones are being used for a wide variety of commercial tasks, ranging from real estate photography to metric mapping. In the United States, the vast majority of these tasks are conducted outside the scope of the commercial rules for operation as specified by the Federal Aviation Administration (FAA). Folks either are unaware that rules even exist or they are taking a calculated risk of ignoring them. Those who are trying to obey the rules are spending thousands of dollars on attorney fees applying for FAA exemptions ("Section 333 exemptions"). Something has to give!

On February 15th, the FAA released its Notice of Proposed Rulemaking (NRPM) for small Unmanned Aerial Systems (sUAS). We have all been anxiously awaiting this sUAS NPRM. The very good news is that they take a very reasonable approach to using sUAS for many local mapping and inspection operations. The bad news is that it is estimated that it will be about 24 months before these rules become final.

The summary of the rules is:

- A sUAS weighs less than 55 lbs (25 kg). Note that this is directly from the FAA summary. I assume the limit is on the mass of the aircraft and not its weight (since no location for weighing is specified).
- Daylight operations within unaided (no binoculars, for example) visual line of sight (VLOS) of the Operator. An Observer is not required. Note that FAA has replaced the notion of an sUAS pilot with an Operator.
- "First Person View" (PFV) can be used but cannot replace the VLOS requirement
- "Small unmanned aircraft may not operate over any persons not directly involved in the operation." (direct quotation from the NPRM summary)
- Maximum air speed of 100 mph and a maximum altitude of 500 feet.
- No operations in Class A airspace (obviously since Class A are those altitudes of 10,000 feet and above) but operations in B, C, D and E are allowed with Air Traffic Control (ATC) approval (no ATC approvals necessary for Class G airspace)
- Minimum weather visibility of 3 miles
- sUAS Operators will be required to pass an FAA prescribed knowledge test and be "vetted" (whatever that means) by the Transportation Security Administration (TSA). They will not be required to obtain a medical certificate or a traditional pilot's license. The sUAS pilot will be referred to as an "Operator" rather than the Pilot in Command (PIC).

Figure 1: A Kaolin Mine

These proposed rules are much more lenient than one would expect, based on the content of the Section 333 exemptions that have been issued to date. All of the 333s have required a minimum of at least a private pilot license and a medical certificate. As mentioned earlier, the bad news is that it will take an estimated 24 months for these rules to replace the current exemption process.

A lot of sUAS entrepreneurs are unhappy with the VLOS rule of the NPRM; it is pretty hard to deliver packages and pizzas if one is limited to line of sight! From a realistic point of view, this is a good rule. I don't think we are quite ready with autonomous navigation systems to trust having an unattended drone zipping over playgrounds.

So given the operating envelope of the NPRM, are there any commercial operations that make financial sense? Obviously there are a myriad of inspection tasks that can be conducted under the new rules. One of the more subtle aspects of the proposed rules is that an Operator can operate the sUAS using First Person View (FPV) if a Visual Observer (VO) is constantly monitoring the sUAS (although the sUAS must be within the VLOS distance of the Operator during this mode of operation). This makes Operator guided inspections of complex systems such as transmission line towers possible.

However, relaying is specifically prohibited so operations such as inspections of opaque objects (think bridges) will not be technically possible. Perhaps others have seen clarity on the notion of Operator relaying but I have not found this either permitted or prohibited (that is, control of the sUAS itself is relayed from operator to operator); relaying by Visual Observers is explicitly prohibited. Basing the Operator on a moving platform is also explicitly prohibited except for certain offshore marine operations.

Obviously small area mapping will be completely within the confines of the NPRM regulations. Sites such as stockpiles, open pit mines (see, for example, the kaolin mine of **Figure 1**), railroad switching yards and, well, you get the idea. Anywhere an area can be controlled in terms of access by "uninvolved" persons and the sUAS is within VLOS of the Operator is a candidate for mapping and inspection.

Unfortunately, the FAA is dogmatically sticking to the confines of the Section 333 process until these new rules can take effect. The unfortunate thing is that the genie is out of the bottle. While hundreds of companies have applied for exemptions in an attempt to stay legal, thousands of operators are disregarding the regulations. The fact that insurance companies are routinely issuing liability policies for sUAS operations without restricting coverage to legal operations is exacerbating the situation. It is unfortunate that FAA has not issued some sort of temporary rules that make sense to the average person. Oh well, it seems the best we can hope for is an expeditious implementation of the proposed rules.

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