



**The Journal of Robotics,
Artificial Intelligence & Law**

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The Use of Drones in Creative Industries: Tech Versus Artistry

Elaine D. Solomon*

This article outlines the requirements of Part 107, the Federal Aviation Administration regulations for unmanned aircraft systems weighing less than 55 pounds engaged in non-recreational operations, as well as Part 107 waivers and authorizations. It then addresses and comments on the use of drones in the motion picture and television industries versus manned aircraft aerial cinematography.

The use of small unmanned aircraft systems (“sUAS” and commonly referred to as drones) has exploded over the past few years, with associated technology advancing rapidly. In part, this has been the result of the Federal Aviation Administration (“FAA”) promulgating regulations for UAS weighing less than 55 pounds engaged in non-recreational operations (so-called Part 107 regulations¹). In addition, the number of waivers or authorizations granted by the FAA to sUAS operators that allow operations outside the restrictions of Part 107 is rapidly increasing. More and more, many industries have been utilizing drones, including insurance, agriculture, oil and gas, construction, journalism, real estate, and the motion picture and television industries. Uses will continue to expand, as the FAA eventually promulgates regulations that will allow greater flexibility for commercial sUAS operations outside of the restrictions of Part 107, including allowing sUAS operations at night, above people,² and/or beyond visual line-of-sight (“BVLOS”).

As drones proliferate and start taking the place of humans for certain activities (such as package delivery, surveying construction sites, and aerial photography), the question arises of whether, in certain creative industries, drones will or should replace manned aircraft for certain activities.

This article will outline the requirements of Part 107, as well as Part 107 waivers and authorizations. It will then address and comment on the use of drones in the motion picture and television industries versus manned aircraft aerial cinematography.

A Reminder of Highlights of Part 107 Requirements

The FAA's Part 107 regulations apply to U.S.-registered UAS weighing less than 55 pounds ("sUAS"), engaged in non-recreational operations. Some of the key requirements of Part 107 include:

Operational Requirements:

- The sUAS must weigh less than 55 pounds (including payload);
- Operations cannot exceed 400 feet above ground level ("AGL"), or 400 feet above a structure;
- Flight speed cannot exceed 100 mph;
- The sUAS must be registered with the FAA, and although no FAA airworthiness certification is required, the operator must maintain the sUAS in a safe condition;
- Flights are only permitted in daylight or twilight (30 minutes before official sunrise and 30 minutes after official sunset, with appropriate anti-collision lighting);
- Flights must be conducted with a minimum weather visibility of three miles from the control station;
- The sUAS must remain in visual line-of-sight ("VLOS") of the operator, with unaided vision except for corrective lenses;
- No person can operate as a Remote Pilot in Command ("RPIC") for more than one sUAS at a time;
- The operator must conduct a preflight inspection before the operation, including inspection of the operating environment, to ensure that the sUAS is safe for operation and has enough power to operate for the intended operational time period. The sUAS does not have to meet the same airworthiness requirements as manned aircraft, nor be certified by the FAA. However, if FAA-certified components are used, the sUAS could be subject to FAA airworthiness directives addressing those component parts. Further, the operator must make the sUAS available to the FAA, upon request, for inspection or testing, as well as inspection of any associated documents and records required to be kept under Part 107.

- The sUAS cannot operate over persons not directly involved in the operation of the sUAS, or under a covered protective structure, and the operation must yield the right-of-way to other aircraft (manned and unmanned);
- Careless and reckless operations are prohibited;
- No operation from a moving aircraft;
- No operation from a moving vehicle unless the operation is over a sparsely populated area;
- No carriage of hazardous materials;
- External load applications are allowed only if the object being carried by the sUAS is securely attached, and does not adversely affect the flight characteristics or controllability of the sUAS;
- Transportation of property for hire or compensation is allowed, with certain restrictions;
- The operator must ensure that applicable aircraft registration rules are satisfied; and
- Limitations in airspace classes: sUAS operation in Class G airspace is allowed without air traffic control (“ATC”) permission; sUAS operation in Class B, C, D, and E airspace is only allowed with ATC permission; sUAS may not be operated in Class A (18,000 feet and above) airspace.

Pilot Requirements:

- Part 107 implemented relaxed pilot certification requirements. Under the rule, there is now a new class of pilot certificate called a Remote Pilot in Command. A person operating an sUAS must either hold a RPIC certificate or be under the direct supervision of a person who holds such a certificate.

How to Get a Waiver or Authorization

As of May 10, 2018, the FAA has granted 1,774 Part 107 waivers for sUAS commercial drone operations.³ Most of those waivers have been to allow nighttime operations, to fly BVLOS, or to allow one remote pilot to operate multiple sUAS at the same time. In addition, separate and apart from the waivers, an authorization must be obtained for permission to operate in certain controlled airspace.⁴

Waivers and authorizations must now be requested through the FAA's "Drone Zone" website.⁵ Note that an airspace authorization request should not be combined with a request for a Part 107 waiver.

The FAA says it takes about 90 days to review and either approve or deny an application, but do not count on it. To improve your chances of approval, you should take a look at previously granted waivers available on the FAA website, and be prepared to make your case as to how and why you can operate your sUAS at levels of safety equivalent to what is required for standard operations under Part 107. Be specific and detailed as to what measures you will take to ensure safe operations. This is all about mitigation of risk. The FAA has a *Risk Management Handbook*, which is not specific to drones, but can be a good source of information. The FAA lists performance-based standards, but they only state what the functional capabilities are—not what equipment or procedures you will need to attain those capabilities, which is what you need to prove via your application. As an example, if you want to conduct nighttime sUAS operations, the FAA has performance-based standards that must be met to obtain such a waiver.⁶ You need to establish what operations you intend to conduct, and how you intend to meet those performance standards.

Only some Part 107 requirements are waivable. You can apply for permission to conduct the following types of operations via the waiver process:⁷

- Nighttime operation;⁸
- Flying Beyond Visual Line of Sight;⁹
- Flying from a moving vehicle or aircraft, not in sparsely populated areas;¹⁰
- Alternative methods to using a visual observer;¹¹
- Flying over people not directly involved in operation of the sUAS;¹²
- One remote pilot flying multiple sUAS;¹³
- Not having to yield the right of way;¹⁴
- Flying near airports/in controlled airspace;¹⁵
- Exceeding Part 107 standard operating limits for sUAS, including flying higher than 400 feet, faster than 100 mph, and flying in less than three statute miles of visibility;¹⁶ and
- Flying in certain controlled airspace—*i.e.*, Class B, C, D and surface area E.¹⁷

If your operations are not eligible for waiver under Part 107, you can try for approval under the Section 333 exemption process.

As Drones Proliferate, Should They/Can They Replace Manned Aircraft for Certain Creative Activities?

There is no question that in many instances drones allow us to perform activities in places that may be unsafe or inaccessible for a manned aircraft, or in a more cost-effective manner than using humans for the same task. However, can or should drones replace humans and/or manned aircraft in certain industries where artistry is an important component, such as the motion picture and television industries? There is no doubt that we have seen stunning aerial cinematography taken by drones—sweeping panoramas, high-altitude shots of places that are inaccessible to manned helicopters or airplanes, flying in/out/through small spaces where no aircraft can possibly go. But will (or should) drones ultimately replace pilots and cameramen in helicopters creating aerial cinematography?

Some Historical Aerial Photography Notes

In the modern film industry, aerial shots are largely captured by use of a manned aircraft (more often than not a helicopter) or a boom arm. We have come a long way from the first efforts at aerial photography and videography by balloon or other methods. In 1858, French photographer Gaspard-Felix Tournachon took photographs of Paris while traveling over the city in a hot air balloon. Many decades later, British meteorologist and photographer E. D. Archibal used kites to take photographs by attaching a camera to the tip of the kite. Then in 1909 (in perhaps the first use of aerial photography for a film), filmmakers shot a three-minute video for the film *Wilbur Wright und seine Flugmaschine* by using an aircraft-mounted camera to capture shots from the air.

Ever since the FAA put regulations in place clearing the way for the use of drones by the film and television industry, directors and cinematographers have been using drones more and more. The Motion Picture Association of America has put pressure on the FAA over the past few years to allow Hollywood to use drones,

resulting in the granting of waivers to many aerial photography companies. Previously, many drone companies had to perform much of their work overseas in countries (including in South America and Europe) that allow drones and that do not have the same restrictions as there are in the United States.

Beware: Legal Ramifications

The legal landscape for drone operations is just beginning. However, as a relevant example from the film industry, one Los Angeles filmmaker found himself facing criminal charges in connection with his drone operations. Arvel Chappell III (an aerospace engineer, filmmaker, and aviation enthusiast) was accused of violating a Los Angeles “anti-drone” ordinance, through which the city attempts to impose restrictions on drone flight within Los Angeles, subjecting violators to sanctions that include possible imprisonment. Mr. Chappell was the first person charged with violating the Los Angeles UAS ordinance. The case set up a classic federal versus state/local federal preemption argument, because the city’s requirements were put in place regardless of the federal/FAA’s requirements. Mr. Chappell was ultimately charged with operating his drone in a “careless and reckless manner” (which is a standard defined by federal law) because his drone allegedly interfered with a police helicopter. A Los Angeles jury returned a “not guilty” verdict. This verdict was handed down the day that the FAA released its Part 107 sUAS rules, so the clash between state/local and federal regulations regarding drone regulations will continue to play out, putting drone operators in the iffy position of having to navigate myriad state, local, and federal rules regulating sUAS throughout the country.

The Pros and Cons of Both Types of Platforms in the Film Industry

Having spoken to some of the best helicopter camera pilots in the business, here is one school of thought on this topic:

Cost

- Arguably, drones are cheaper—a camera drone and crew costs less than a helicopter shoot. Hourly rate, plus

insurance, plus camera gimbal system, plus crew typically puts helicopter shooting over the top.

Safety

- Helicopter crashes have killed more than 30 people on the film and television sets since the 1980s. However, as with any aviation endeavor, the key is to ensure that professionals with top-notch credentials and respect for preparation and safety are used for flying and filming.
- Conversely, drones can be unsafe as well. There have been accidents where operators have lost control of the drone, resulting in personal injury. There have also been “near misses” of drones with manned aircraft. There was also the rather recent incident of a DJI Phantom 4 drone colliding with a U.S. Army UH-60M Black Hawk helicopter that was on security patrol over New York Harbor on September 21, 2017, resulting in damage to the Black Hawk. The National Transportation Safety Board (“NTSB”) faulted the drone operator, who admitted he had lost site of the drone just before the collision. In addition, drones are getting bigger and heavier in order to have increasing capabilities, so it is just a matter of time before there are significant accidents. Thus, this is not yet a fair comparison point between helicopters and drones.

Helicopter

- Although drone cameras and aerial photography capabilities continue to improve dramatically, a helicopter is “faster and stronger.” It can carry larger, better-quality, higher-definition cameras, and can withstand conditions that drones cannot tolerate, such as downwash from aircraft in the shot, wind or other weather-related conditions.
- In addition, helicopters can fly farther and longer. Drones are limited in terms of battery pack life.
- Moreover, for certain filming such as action scenes, including high-speed action scenes, car chases, etc., a helicopter is preferable. There is more control over the shot in terms of “on the fly” adjustments and changes, versus a preset shot for a drone. There is also better image quality and stabilization, although drones continue to improve regarding this factor.

Drones

- Drones can fly in places that helicopters cannot—in and through trees, in and out of buildings and tight, small spaces, over and above places and scenery that no helicopter or airplane can reach. They can capture images previously unattainable that a manned helicopter cannot capture.
- However, drones are generally not good for action shots—they are better used as a tool to go somewhere no one else can go, for documentary and sweeping panoramas that do not require quick adjustment, action, or capturing feelings and emotions that create and tell a story.

Artistry: The Critical Element

- Drones typically have a preset, recorded flight path. Thus, there is limited allowance for creativity. It is often very difficult or more difficult than one might think to set up and preset a shot.
- With a drone, the camera is not with the cameraman “live,” so the cameraman only sees what is on the screen, versus with helicopter filming, the cameraman is in the helicopter watching the filming as it unfolds and can direct and react to the same, along with the pilot.
- Largely because the pilot is not with the drone in the air, and the tech involved, drone photography tends to be “mechanical”—there is the lack of capturing a feeling or emotion.

Conclusion

There is no doubt that tech is amazing. It allows us to do things we could once only dream of. However, perhaps we should not give into the knee-jerk reaction that tech is always best. It does not trump artistry. The human element. The ability to tell a story through the eyes of a person; to create a story through the way the flying is done to capture the shot and film the scene. No drone can replicate that. The rest of us can just look on in awe, enjoying and respecting the flying and the footage.

Notes

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1. 14 C.F.R. Section 107.

2. As this article is being submitted, the U.S. Department of Transportation has sent two proposed rules to the White House—one of the new rules would allow drones to fly over people, while the other would allow for remote identification and tracking of sUAS in flight. After these rules are formally proposed, it is still expected to take many months or even more than a year before they are finalized.

3. If you want to operate a drone with a total weight of more than 55 pounds, you should consider applying for a Section 333 exemption. See www.faa.gov/uas/beyond_the_basics/section_333.

4. There is a Part 107 waiver process, and also an authorization process, for flying in controlled airspace, which is somewhat confusing. The Part 107 waiver process allows one to submit an application for an airspace waiver if the applicant can demonstrate that their sUAS can operate safely in controlled airspace without having to seek prior ATC authorization. However, as the FAA says on its website, using the waiver process rather than seeking an airspace authorization will take longer and require additional safety justification. Having said that, an airspace authorization is short-term (up to six months) and grants access to a more limited operating area; an airspace waiver is longer-term (six months to two years) and grants access to a larger operating area.

5. <http://faadronezone.faa.gov/>.

6. <https://www.faa.gov/news/updates/>.

7. Section 107.205 lists specific regulations that are waivable.

8. Section 107.29.

9. Section 107.31.

10. Section 107.25.

11. Section 107.33.

12. Section 107.39.

13. Section 107.35.

14. Section 107.37(a).

15. Section 107.41.

16. Section 107.51.

17. Section 107.41.