UF IFAS Extension UNIVERSITY of FLORIDA

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Instructions on the Use of Unmanned Aerial Vehicles (UAVs)[1]

Sri Charan Kakarla and Yiannis Ampatzidis[2]

This document provides guidance on the appropriate use of unmanned aerial vehicles (UAVs) or unmanned aircraft systems (UAS) in Florida. All research and commercial activities involving the use of UAVs must be conducted in compliance with applicable federal and state laws, statutes, and regulations. The Federal Aviation Administration (FAA) has jurisdiction over all navigable airspace in the United States. All aircraft, whether manned or unmanned, are subject to FAA rules and regulations. Any violations carry federal penalties that can range from $400 to $5,500 or more depending on the situation (Koebler 2016).

The Small UAS Rule adds a new Part 107 to Title 14 of the Code of Federal Regulations (14 CFR) to allow for routine civil operation of small unmanned aircraft systems in the National Airspace System (NAS) and provide safety rules for those operations. The rule addresses airspace restrictions, remote pilot certification, visual observer requirements, and operational limits in order to maintain the safety of the NAS and ensure that small UAS do not pose a threat to national security.

The FAA allows small (under 55 lb) unmanned aircraft operated solely for hobby and recreational purposes to be flown under the rules and restrictions outlined in Section 336 of the FAA Modernization and Reform Act of 2012 (U.S. Government Publishing Office 2012). Currently, the FAA considers the use of an unmanned aircraft for educational or training purposes as a commercial activity (14 CFR Part 91—"Interpretation of the Special Rule for Model Aircraft").

Below is a step-by-step guide to operating a UAV for commercial (or research) purposes.

Before You Fly

You will need to get a remote pilot certificate if you are flying the UAV for commercial use. You must be at least 16 years old in order to obtain a remote pilot certificate.

Getting a Remote Pilot Airman Certificate

IF YOU ARE A CURRENT MANNED AIRCRAFT PILOT

1. Take the Part 107 online course (ALC-451) on the FAA website (https://www.faasafety.gov/).
2. Complete the FAA Form 8710-13 by registering on the IACRA website (https://iacra.faa.gov/IACRA/Default.aspx).
3. A temporary certificate will be issued.
4. A permanent certificate, which is to be renewed every two years, will be mailed once the process is complete.

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2. Sri Charan Kakarla, engineering and research technologist; and Yiannis Ampatzidis, assistant professor, Department of Agricultural and Biological Engineering, UF/IFAS Southwest Florida Research and Education Center; UF/IFAS Extension, Gainesville, FL 32611.

IF YOU ARE A FIRST-TIME PILOT

1. Schedule an appointment with a knowledge testing center.

2. Take the Part 107 exam.

3. Once you pass the exam, complete the FAA Form 8710-13 (https://iacra.faa.gov/IACRA/Default.aspx); a temporary certificate will be issued.

4. A permanent certificate, which is to be renewed every two years, will be mailed once the process is complete.

FAA PART 107 TEST

1. Call Computer Assisted Testing Service (CATS) at 1-800-947-4228 to schedule an appointment for the exam.

2. There are numerous test guides available online for the Part 107 FAA exam. For more information on the FAA Part 107 exam, visit https://www.faa.gov/uas/getting_started/fly_for_work_business/becoming_a_pilot/.

3. The list of test centers in the state of Florida is available at https://www.faa.gov/training_testing/testing/media/test_centers.pdf.

There are various resources available online that can help you prepare for the Part 107 test. UF Environmental Health & Safety (UF EH&S) and programs such as the UF/IFAS Precision Agriculture Engineering Program at the UF/IFAS Southwest Florida Research and Education Center (UF/IFAS SWFREC) across the state of Florida also offer courses that help members of the general public obtain a remote pilot certificate. Interested individuals should keep track of announcements for the course schedule.

The knowledge test areas include:

- Applicable regulations relating to small unmanned aircraft system rating privileges, limitations, and flight operation
- Airspace classification and operating requirements, and flight restrictions affecting small unmanned aircraft operation
- Aviation weather sources and effects of weather on small unmanned aircraft performance
- Small unmanned aircraft loading and performance
- Emergency procedures
- Crew resource management
- Radio communication procedures
- Determining the performance of small unmanned aircraft
- Physiological effects of drugs and alcohol
- Aeronautical decision-making and judgment
- Airport operations
- Maintenance and preflight inspection procedures

Ready to Fly

Preflight Checklist

1. Make sure you register your UAV with FAA if it weighs more than 0.55 lb. A UAV can be registered on the FAA website (https://faadronezone.faa.gov/).

2. Check if you are authorized to fly in the area. The FAA provides an app for this purpose called *B4UFLY* for Android and iOS devices. For more information, visit https://www.faa.gov/uas/where_to_fly/b4ufly/.

3. There are several preflight checklists available online as well as ones that are provided by the manufacturer. These require you to consider various factors, such as weather, environment, equipment inspection, mission plan, etc., to make sure the UAV is ready to fly.

4. Maintaining flight logs is recommended, so that in case of a mishap, the situation can be analyzed and prevented from happening again.

During Flight

1. Make sure the UAV is always in your line of sight.

2. Unmanned aircraft must weigh less than 55 lb, including payload, at takeoff.

3. Fly in Class G airspace.

4. Keep the unmanned aircraft within your visual line of sight.

5. Fly at or below 400 ft AGL (above ground level).

6. Fly during daylight or civil twilight.

7. Fly at or under 100 mph.

8. Yield right of way to manned aircraft.

9. Do not fly directly over people.

10. Do not fly from a moving vehicle unless you are in a sparsely populated area.

In addition to these general rules, there may be other regulations in effect. Therefore, users should check 14 CFR Part 107 on the FAA website for more detailed operating rules (Electronic Code of Federal Regulations 2018).

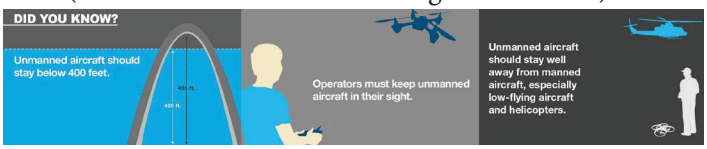

Figure 1. Rules to keep in mind during flight.
Credits: FAA DroneZone

Airspace Requirements

- Class G: Air traffic control (ATC) authorization is not needed to operate in this airspace. Check the *B4UFLY* app, which provides information about airspace restrictions and flying requirements using your mobile phone's location.
- Classes B through E: ATC authorization is required to operate; it is subject to waiver. In most cases, for Class E airspace, a remote pilot will not need ATC authorization.
- If you need to fly the UAV in Classes B through E, you will need to apply for a Part 107 authorization or waiver. It may take up to 90 days for the FAA to process it.

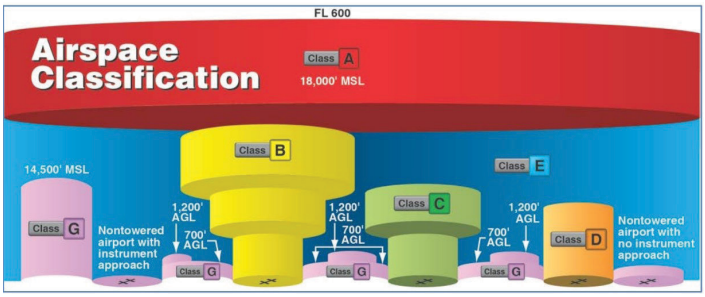

Figure 2. Airspace profile (MSL: mean sea level; AGL: above ground level) (FAA-G-8082-22).
Credits: Federal Aviation Administration

Part 107 Waiver and Operation in Controlled Airspace

The FAA will issue waivers or authorizations to certain requirements of Part 107 if an applicant demonstrates they can fly safely under the waiver without endangering people or property on the ground or in the air. The FAA will review the request and issue decisions within 90 days. In order to apply for a Part 107 waiver, you need to follow the steps listed below.

Step 1: Determining What You Need

Before applying for a waiver, remote pilots have to identify the kind of authorization they require and select only the ones they need. A few common requests are listed below.

- Flying at night
- Flying directly over a person or people
- Flying from a moving vehicle or aircraft, not in a sparsely populated area
- Flying multiple aircraft with only one pilot
- Flying beyond the pilot's visual line of sight
- Flying above 400 ft AGL
- Flying near airports or in controlled airspace

Step 2A: Operational (Non-Airspace) Requests

If you need a non-airspace waiver, you will need to apply for a Part 107 waiver.

Step 2B: Controlled Airspace Requests

If you need to fly the aircraft in a controlled airspace, you have to apply for an airspace authorization.

The Part 107 waiver and airspace authorization applications must be submitted through FAA's online portal, DroneZone (https://faadronezone.faa.gov/).

Step 3: FAA Decision

Depending on the complexity of your request, the FAA may request additional information and supporting documentation during the evaluation process.

Even though it is a common request, an application to fly Beyond Visual Line of Sight (BVLOS) will likely be rejected. The FAA does not have a set of guidelines for this kind of operation. Research and discussion regarding BVLOS are ongoing.

UF EH&S UAS Policy and Procedures

Any faculty, staff, student, or vendor must obtain authorization prior to conducting any UAS flight operations while on any university property or in connection with university employment, regardless of location or category of flight (i.e., civil, public, or recreational).

The Office of Unmanned Aircraft Systems within UF Environmental Health & Safety is the single point of contact for any FAA certificate of authorization, waiver, or exemption involving the University of Florida, its faculty, students, or staff. All waivers, authorization, or exemptions must be approved by UF EH&S prior to submission to the FAA for approval. UAS shall not be used to monitor or record areas where there is a reasonable expectation of privacy in accordance with accepted social norms. These areas include but are not limited to restrooms, locker rooms, individual residential rooms, changing or dressing rooms, and health treatment rooms.

All potential operators will need to register with the UF EH&S Office of Unmanned Aircraft Systems by providing required information. Pilot registration is only necessary once, unlike the flight plan form, which must be submitted for each flight. Each flight will be evaluated individually and requires submitting a separate flight plan form for each planned operation (UF Business Affairs 2018).

UF/IFAS Unmanned Aircraft Systems Research Program (UF/IFAS UASRP)

The UF/IFAS UAS Research Group can help researchers at the University of Florida and multidisciplinary resources allow researchers to transform project specifications into a suitable UAS mission. The UF/IFAS UAS Research Group also provides extensive logistical support in obtaining appropriate authorization to fly, such as filing for Certificate of Authorization (COA) with the FAA. The group serves as the primary contact for COA applications at the University of Florida. Developing a mission plan with the program allows the researchers to utilize centralized UAS resources and reduce the costs associated with deploying the technology. A realistic budget for UAS operations is also provided to include in research proposals and grant applications.

The staff and students who are dedicated to developing this technology are also available for deployment on a wide variety of missions. All of the necessary equipment and safety gear for field deployment, including the UAS, ground station, and field tools, are available (UF/IFAS 2017).

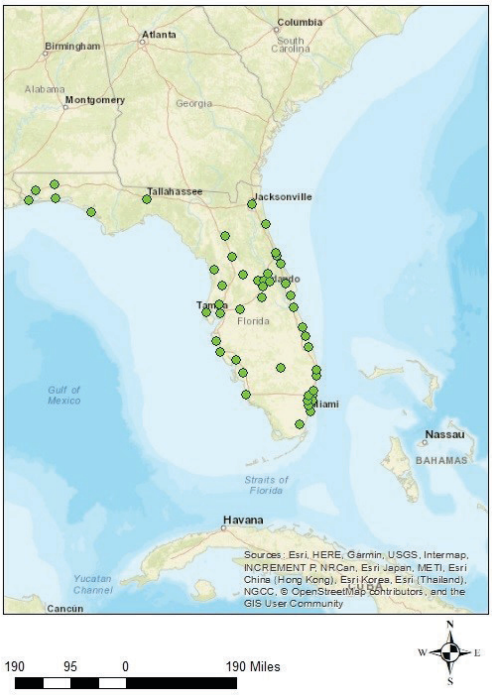

Figure 3. Map showing the Part 107 test locations available across Florida.
Credits: © OpenStreetMap contributors

Conclusion

If a UAV needs to be used for research or commercial purposes, the user has to obtain a remote pilot license and follow all the rules and regulations established by the FAA under Part 107 for a safe and successful flight. Furthermore, if the UAV belongs to the University of Florida and has to be used on its premises, the user needs to have all the required authorization from UF EH&S prior to the flight. The UF/IFAS UASRP can assist researchers and partnering organizations in various projects that require a UAV operation.

FAA Terms and Definitions from DroneZone

Aircraft: 49 U.S.C. § 40102(a) (6) defines an "aircraft" as "any contrivance invented, used, or designed to navigate or fly in the air." The Federal Aviation Administration's (FAA's) regulations (14 C.F.R. § 1.1) similarly define an "aircraft" as "a device that is used or intended to be used for flight in the air."

Public Aircraft: The FAA classifies all aircraft as belonging to one of two categories: public or civil. A public aircraft is one owned and operated by the United States government or the government of a state, the District of Columbia, or a territory or possession of the US or a political subdivision.

Any aircraft that does not meet the definition of a public aircraft is considered a "civil aircraft." Any UAS use requires FAA approval.

Unmanned Aircraft (UA): Unmanned aircraft is an aircraft operated without the possibility of direct human intervention from within or on the aircraft. This proposed definition is consistent with the definition of "unmanned aircraft" specified in Public Law 112–95.

Small Unmanned Aircraft (SUA): The term "small unmanned aircraft" means an unmanned aircraft weighing less than 55 pounds.

Unmanned Aircraft System (UAS): The term "unmanned aircraft system" means an unmanned aircraft and associated elements (including communication links and the components that control the unmanned aircraft) that are required for the pilot in command to operate safely and efficiently in the National Airspace System. A UAS is the unmanned aircraft (UA) and all of the associated support equipment, control station, data links, telemetry, communications and navigation equipment, etc., necessary to operate the unmanned aircraft.

Certificate of Waiver; Certificate of Authorization (COA): The terms "Certificate of Waiver" and "Certificate of Authorization" refer to a Federal Aviation Administration grant of approval for a specific flight operation (U.S. Department of Transportation n.d.).

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