

Introduction to Drones

**Shawn Barstow, Justin Clawson,
Shalyn Drake, Eric Galloway, and
Michael Pate**

02/19/2025



Unmanned aircraft systems (UAS), otherwise known as “drones,” have been used in all aspects of aviation for years and will continue well into the future. One of the first developed drones was the British Royal Navy DH-82 Queen Bee in the 1930s (the word “drone” was coined from the male bee or drone). After those original UAS, the U.S. and other countries developed many types of unmanned aircraft in military settings, helping advance every area of civil aviation, including agriculture. Additionally, drones have been used recreationally as fixed-wing (known as RC airplanes) since the 1930s. Unmanned aircraft have advanced so much that they are completing tasks and integrating into all aspects of our lives. They deliver, survey, collect data, and complete assigned tasks with more efficiency and lower cost than many currently used techniques. The Federal Aviation Administration (FAA) completely supports UAS in the National Airspace System (NAS) and continually updates information in this new and exciting field. This fact sheet will help you identify how you can legally fly drones and become an integral part of aviation’s vast and ever-progressing world.

Definitions and Acronyms

- CBO – Community Based Organization.
- CFR – Code of Federal Regulations.
- Drone – any unmanned aerial vehicle to include fixed-wing or multicopter.
- FAA – Federal Aviation Administration.
- NAS – National Airspace System.
- Part 107 – FAA UAS Commercial Certificate.
- sUAS – “Small” unmanned aircraft that weighs between 0.55 and 55 pounds.
- TRUST – The Recreational UAS Safety Test.
- UAS – unmanned aircraft system.

Common Drone Applications

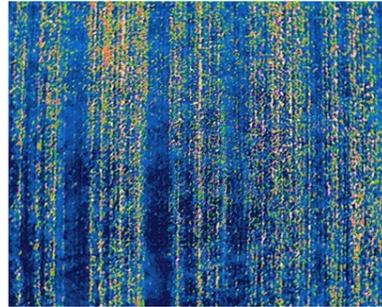


Photo 1. *Alfalfa Field Irrigated With Subsurface Drip Irrigation*

There are several common operations in which drones excel. Some of these include:

- *Agriculture:* gathering survey-grade information, observing plant life/health and water pathways and erosion, checking irrigation efficiency (Photo 1), snow runoff, and managing livestock (Photo 2).
- Applying pesticides and fertilizers (Photo 3).
- *Search and rescue:* finding anything from humans, runaway dogs or pets, lambs, etc.
- *Photography/videography:* real estate, historical documentation, special events (Photo 4).
- *Public service:* monitoring crowds (Photo 5), fires, hostage standoffs, traffic flow surveys, overwatch, and inspections.
- Tracking transportation, construction, volume estimates, large land surveys, and package delivery.
- *Inspection:* observing everything from power lines to roofs to bridges and more.
- *Tourism:* mapping, trail videography, and social media (Photo 6).

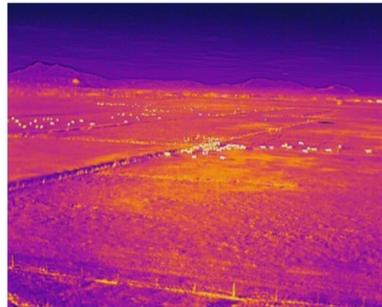


Figure 2. *Beef Cattle Grazing in Pasture*



Figure 3. Large Drone

Over 55 lbs. With Liquid and Dry Tank for Fertilizer or Pesticides



Figure 4. Blue Creek

Research Farm Field Day Parking and Participants



Figure 5. Thermal Image

of a Public Event Used to Identify Public Traffic Movement



Figure 6. 3D Image of a

Rodeo Parking Lot

Rules of the Skies

Fly recreationally: Trust certificate

Fly commercially: Part 107 certificate

Since its inception, the FAA was created “to provide for the safe and efficient use of the national airspace” (FAA, 2022). To complete its mission, the FAA has developed rules and regulations to ensure the safety of people and property and maintain the integrity of the national airspace.

The rules related to small UAS (sUAS, meaning between 0.55 and 55 pounds) and their commercial usage are found in the U.S. Code of Federal Regulations (CFR) Title 14 Part 107 (FAA, 2023). These rules apply to using drones commercially and include how to fly safely in the NAS while receiving compensation for your operations. Given that not all drones will be flown in a commercial environment, the FAA established The Recreational UAS Safety Test (TRUST) to guide people who want to fly recreationally or for fun (FAA, 2024). Regardless of your needs or age, everyone flying a sUAS should, at a minimum, have their TRUST certificate. Based on the intent of your flight, you need to determine if you are flying strictly under your TRUST certificate for recreational purposes or if you will receive compensation for your flight, requiring a Part 107 certificate.

Recreational UAS Flights - TRUST

CFR Title 49 – 44809 states that all recreational UAS operators must pass an aeronautical safety and knowledge test (Office of the Law Revision Council, 2024). The FAA developed TRUST to fulfill this requirement. TRUST training provides education on safety, rules, and regulatory information and tests you on that information. To find an approved test administrator, please visit [The Recreational UAS Safety Test \(TRUST\)](#).

The free test should be completed before flying your drone recreationally, regardless of age. You will also find a list of approved Community Based Organizations (CBO) from which you can look up and adopt their rules for flying fixed-wing or multirotor drones. There are currently four CBOs registered with the FAA. Once again, this test is free and required for all drone pilots who fly recreationally.

Part 107 Certificate

To fly a sUAS commercially, you must be a certificated remote pilot. This is what is commonly referred to as getting your “Part 107.” This FAA certificate allows you to fly your drone and receive compensation for your flights. This compensation includes receiving money, transferring goods or services, and even self-promotion. Currently, this test is a knowledge-based test without a practical evaluation. That means you only have to pass the FAA Unmanned Aircraft General Knowledge test. This 60-question test must be taken at a FAA-approved testing site, usually at an airport. Find details on how to take your test on this FAA website: [Certified Remote Pilots Including Commercial Operators](#). The age limit is 16 years old or older. This test is a one-time test to get your Part 107 certificate, which has no expiration date. However, to remain current and legal, you must take recurrent training

through the [FAA Safety website](#) within every 24 calendar months of your original certificate.

If you would like help studying for your test, Utah State University (USU) offers several courses either through the academic programs of [Aviation Technology](#) in the College of Agriculture and Applied Sciences or the Aggie Drone Academy, a USU Extension program (see contact information below).

FAA Exceptions or Waivers

The FAA realizes that not all operations involving drones fall under recreational flight or Part 107 and, therefore, has created several exceptions and waivers to help cover those areas. Some common examples are flights of drones weighing over 55 pounds, public service operations (police, fire, search and rescue), local government entities, and education and research. All these situations require additional training and may not require a Part 107 certificate. Nevertheless, drone trainings will help you understand how to integrate into the NAS and be safe while you fly your drone.

Drone Registration

Regardless of how you fly your drone, and under what rules you fly, you will need to register your UAS. The FAA has developed a site called the "[FAA DroneZone](#)" (FAA, n.d.). At this site, you can create a free account with the FAA and register your drones. You then chose how to register your drone, either commercially (Part 107) or recreationally. Each registration has a minimal cost, which currently lasts three years before expiring.

Conclusion

Every UAS flight becomes part of the National Airspace System and operators need to know how to fly safely and responsibly. Please reach out to Part 107-certified drone pilots before you fly, and it will make it easier to do this right the first time. Remember, drones are a part of aviation; welcome to the world of flight!

Contact Information Aggie Drone Academy

Shawn "BW" Barstow, Director
USU Extension Assistant Professor,
Aviation Technology, UAS
Phone: 435-613-5253
Email: shawn.barstow@usu.edu

Justin Clawson, Cache County Manager
USU Extension Assistant Professor,
Agriculture and Natural Resources
Phone: 435-752-6263
Email: justin.clawson@usu.edu

Shalyn Drake, Manager
Lecturer, Aviation Technology
Phone: 435-613-5506
Email: shalyn.drake@usu.edu

Funding Acknowledgment

This work was supported by the High Plains Intermountain Center for Agricultural Health and Safety CDC/NIOSH Grant No. U54OH008085. Its content is solely the responsibility of the authors and does not necessarily represent the official views of CDC/NIOSH, Utah State University Extension, or the Utah Agricultural Experiment Station.

References

- Federal Aviation Administration. (2024, June 17). *The recreational UAS safety test*. FAA.gov. https://www.faa.gov/uas/recreational_flyers/knowledge_test_updates
- Federal Aviation Administration. (2023, August 8). *Certificated remote pilots including commercial operators*. FAA.gov. https://www.faa.gov/uas/commercial_operators
- Federal Aviation Administration. (2022, August 2). *Mission and responsibilities*. FAA.gov. https://www.faa.gov/jobs/who_we_are/history_legacy
- Federal Aviation Administration. (n.d.). *FAA DroneZone*. FAA.gov. <https://faadronezone-access.faa.gov/#/>
- Office of the Law Revision Counsel. (2024, June 18). 49 USC 44809. House.gov. <https://uscode.house.gov/view.xhtml?req=44809&f=treesort&fq=true&num=1&hl=true&edition=prelim-prelim-title49-section44809>



February 2025
Utah State University Extension
Peer-reviewed fact sheet

[Download PDF](#)

Authors

Shawn Barstow, Justin Clawson, Shalyn Drake, Eric Galloway, and Michael Pate