



**Drones
Up, Up, and Away!**

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Poll: Does your institution have drones on campus?

- Yes.
- No.
- If yes, what are the drones primarily used for?
 - Academics or Research or Marketing or Recreational
- I don't know.

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Fun Facts

- **They were developed by the military**
These devices first came to the market in the 1990s and were developed by the military. Drones were invented because they are needed in small spaces where a normal helicopter can't go or in war zones where it is too dangerous to send pilots.

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Fun Facts

- **Model airplanes are also considered drones**

A drone is a machine that can fly without a pilot controlling it. In contrast, model airplanes fly with the help of pilots but because the model airplanes can't move out of a pilot's periphery of vision, they are also considered drones.

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Fun Facts

- **Drones have multiple purposes**

At first, it was believed that drones can only be used by the police or by the military for surveillance or attack. On the contrary, nowadays most drones are used for fun, as a hobby, or for photography and recording. Air stunts and action videos are some of the multiple purposes a drone has.

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Fun Facts

- The FAA announced in January of 2018 that they had registered over 1 million drones, and estimated there would be more than 2 million drones registered in the US by the end of 2018.
 - Hobbyists account for 878,000 of the registrations, each of which can include multiple drones.
 - Businesses which must register each drone they use separately, account another for 122,000.

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Fun Facts

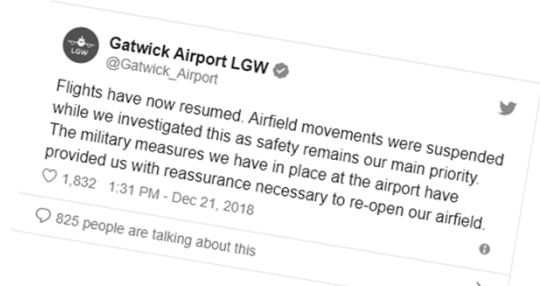
- The drone industry's projected revenue is expected to exceed **\$82 billion** by 2025.

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Drone Drama



Passengers left grounded at London's Gatwick following drone sightings on December 20. *Peter Nicholls/Reuters*



Gatwick Airport in Fresh Drone Drama as Three Flights are Diverted

Posted By: Harry McNabb on: April 28, 2019



In what seems to be becoming a regular event, Gatwick Airport diverted three flights to Stansted Airport following what is being described as a "possible drone sighting" at London's Gatwick Airport.

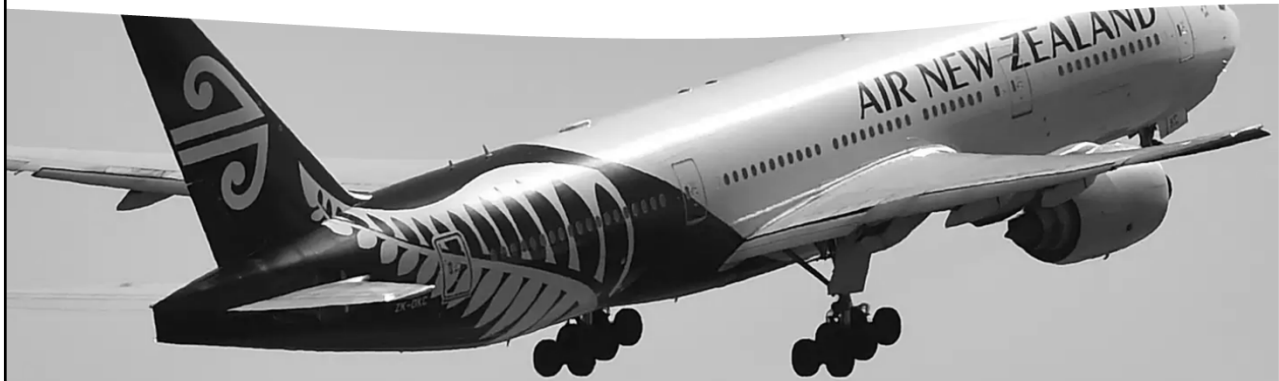
Two Easyjet Flights – one arriving from Barcelona and one from Amsterdam – were sent to Stansted airport before

taking off again and landing at Gatwick. A third flight, from British Airways originating from Heraklion airport in Crete, Greece was also diverted.

The three flights all landed safely at Gatwick after their scheduled arrival.

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A New Zealand flight heading to Auckland had a "close near miss" with a rogue drone in 2018. The drone reportedly came within 16 feet of the plane and almost caused an accident. These types of events cause panic and prompt stricter deterrents for those flying in no fly zones.



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- The University of Dayton Research Institute (UDRI) performed a test, using a DJI drone, that was designed to capture the potential dangers drones pose to manned aircraft. The test was intended to compare a bird strike and a drone strike.
- DJI calls the study misleading and demands UDRI to withdraw the video and blog post. DJI's Vice President of Policy & Legal Affairs said UDRI "recklessly created and promoted a video that falsely claims to depict a dangerous condition posed by one of our products. ... Your public comments deliberately present an entirely improbable, if not impossible, event as a commonplace risk routinely faced by airplane pilots."

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Our Drone Drama

Drone strikes man near Bryant-Denny Stadium, police identify operator
Posted Nov 19, 2014

Tuscaloosa drone

Tuscaloosa police released these images Wednesday as they try to track down the operator of a drone that struck a pedestrian Saturday. The images were pulled from a video camera attached to the drone. (Tuscaloosa Police Department)

TUSCALOOSA, Alabama -- Tuscaloosa police have identified the operator of a drone that struck a man walking near Bryant-Denny Stadium Saturday.

Tuscaloosa police said they recovered a "white Phantom drone" around 2:30 p.m. Saturday in a parking lot on 12th Avenue near Bryant Drive, and are interested in talking with the operator. The drone struck the pedestrian as it was descending from flight.

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Fines

Typically fines are between \$1-2k and usually are settled for less.

The pilot that crashed his drone by Bryant Denny was fined \$1,100, but it was reduced to \$900.

Commercial fines are usually much higher.

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Commercial Fines

- **All over Manhattan, SkyPan; \$1.9 Million**
This is the largest drone fine ever levied. According to the FAA, SkyPan repeatedly flew near high rises in restricted airspace.
- **Coney Island Boardwalk, David Quinones, July 4, 2015; Surrendered Pilot's license**
Quinones was hired by a company called Skycam to fly a drone over the Nathan's Famous Hot Dog Eating Contest. Quinones, a commercial pilot of manned aircraft, had his pilot's license suspended for 90 days and was required to surrender his pilot's certificate during the suspension. The FAA said it would fine him \$1,100 per day that he refused to surrender it.

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Drones in the News

Drone Delivery Heroes Zipline Launch World's Largest Vaccine Delivery Network in Ghana

Posted By: Miriam McNabb on: April 24, 2019



image courtesy Zipline

It's been quite a week for drone delivery. The FAA announced that Wing had received the first ever airline carrier for drones authorization, which would open the doors to commercial package delivery in the United States.

Now, global drone delivery heroes Zipline, who established a ground-breaking medical delivery network in Rwanda and have set the standard for

developing drone delivery programs in developing countries, announce the largest vaccine drone delivery network in the world.

Chula Vista Police Drones Help in Close to 60 Arrests in First 5 Months

The drones, equipped with cameras, have been used in more than 400 incidents in the first five months of the program, according to CVPD. They attribute 59 arrests to the new tool.

By NBC 7 Staff

Published Apr 25, 2019 at 10:23 AM | Updated at 11:55 AM PDT on Apr 25, 2019

Craftsmen built Notre Dame, now it's up to hi-tech robots and Chinese drones to save it. How will they pull it off?

- Some of the technology to be used to restore the cathedral has already been on display including China-made drones equipped with HD cameras
- The rebuilding effort is likely to draw upon expertise gleaned from disasters like the Fukushima Daiichi nuclear disaster in Japan and the Brazilian National Museum fire

The Washington Post
Published: 9:28am, 17 Apr 2019

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Drones in the News

Drones were present in a variety of forms at Super Bowl LIII in Atlanta, Georgia last week. Tethered quadcopters provided an added layer of security while pre-programmed drones lit up the sky during the halftime show. Present in record-breaking numbers, drones at the NFL championship game set a new precedent for unmanned aerial systems at major public events.



Image Source: [Intel](https://www.intel.com)



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Do-Gooder Drones

Drones restored cell service to Puerto Rico after Hurricane Maria.

Drone based tornado fieldwork in the Great Plains.

The Snot Bot - Drones for Whale Research.

Zipline launches world's largest drone delivery network.

Drone lights up efforts to save hiker trapped on ledge at night in Utah.

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IN THE NEWS: UA College of Engineering uses drones to analyze damage at JSU

March 30, 2018 - [WVUA \(Tuscaloosa\) 3/27](#) - [Aerospace Engineering and Mechanics](#)

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Drones have become a popular item and now the University of Alabama's engineering department has found a new way to put them to use. The UA's Remote Sensing Center used its drones to help Jacksonville state university assess damage to campus buildings after they were hit by a tornado last week... [Read more](#)

Sources: [WVUA \(Tuscaloosa\) 3/27](#), [WVUA \(Tuscaloosa\) 3/29](#)



EF-3 tornado cut a swath through the JSU's campus.



23 buildings were severely damaged and 50 more were impacted.

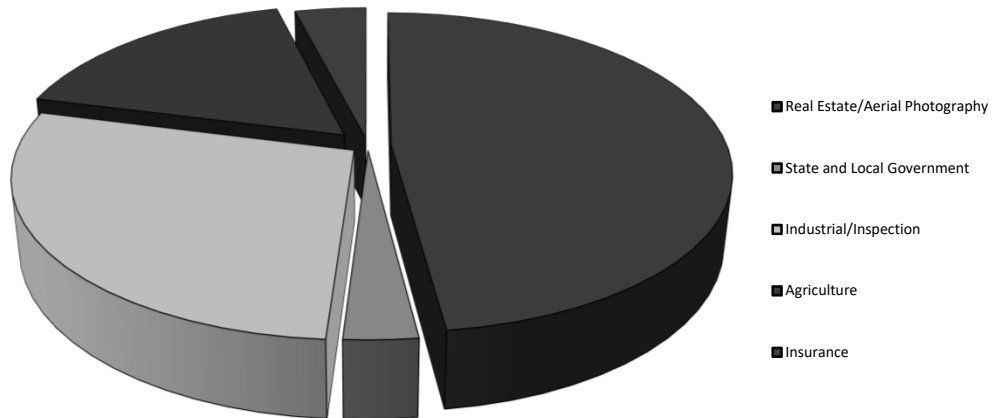


Dynamic aerial views provided by UA's drones helped assess damage that may not have been visible otherwise.

UA assists Jacksonville State University with Tornado Recovery Efforts.

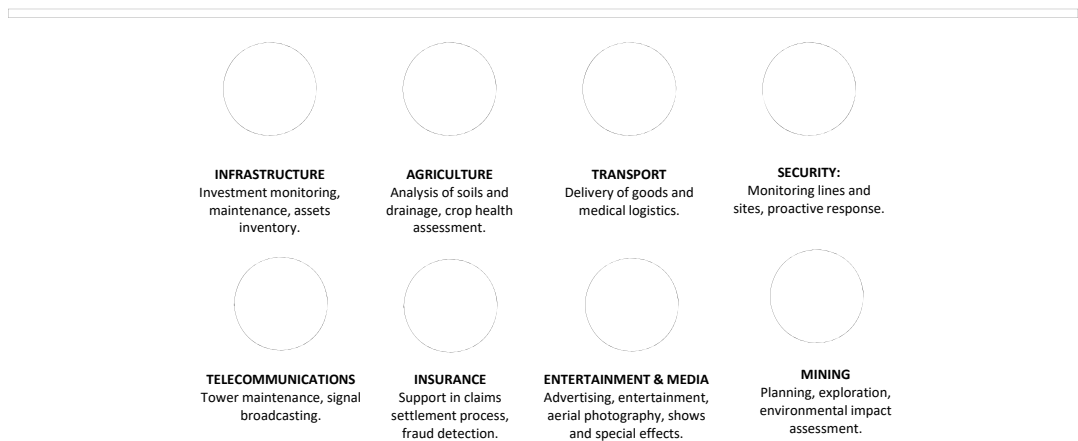
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Doing Business in the Drone Age



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How will drones impact business?



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What is a Drone?

A drone or unmanned aircraft system is an aircraft without a person inside of it controlling it.

- Drones are regulated by the Federal Aviation Administration (FAA).
- The FAA Reauthorization Act of 2018 (partially implemented) may substantially change the how pilots operate a drone.
- Campus policies and procedures must align with the FAA regulations and guidance.

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FAA Regulations

- FAA rules will vary depending on the mission. There are three types of missions:
 1. Recreational Flyers & Modeler Community-Based Organizations. Educational users fall under this category;
 2. Certificated Remote Pilots including Commercial Operators;
 3. Public Safety and Government.

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Certificate of Registration



- All drones (regardless of flight type) should be registered if it weighs more than **0.55 lbs.** (250 grams) and less than **55 lbs.** (25 kg).
- Pilots are subject to civil and criminal penalties if they meet the criteria to register a drone and do not register.
- Drones must be labeled with the registration number and visible on the exterior of the aircraft.
- Registration is \$5.00 and valid for three years.

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Remote Pilot Certificate



- In order to fly a drone under the Small UAS Rule (Part 107), you must obtain a Remote Pilot Certificate (RPC) from the FAA. This certificate demonstrates that pilots understand the regulations, operating requirements, and procedures for safely flying drones.
- The cost for a Remote Pilot Certificate is \$150.00 and it is valid for 2 years. Users must pass a knowledge exam to obtain the RPC.

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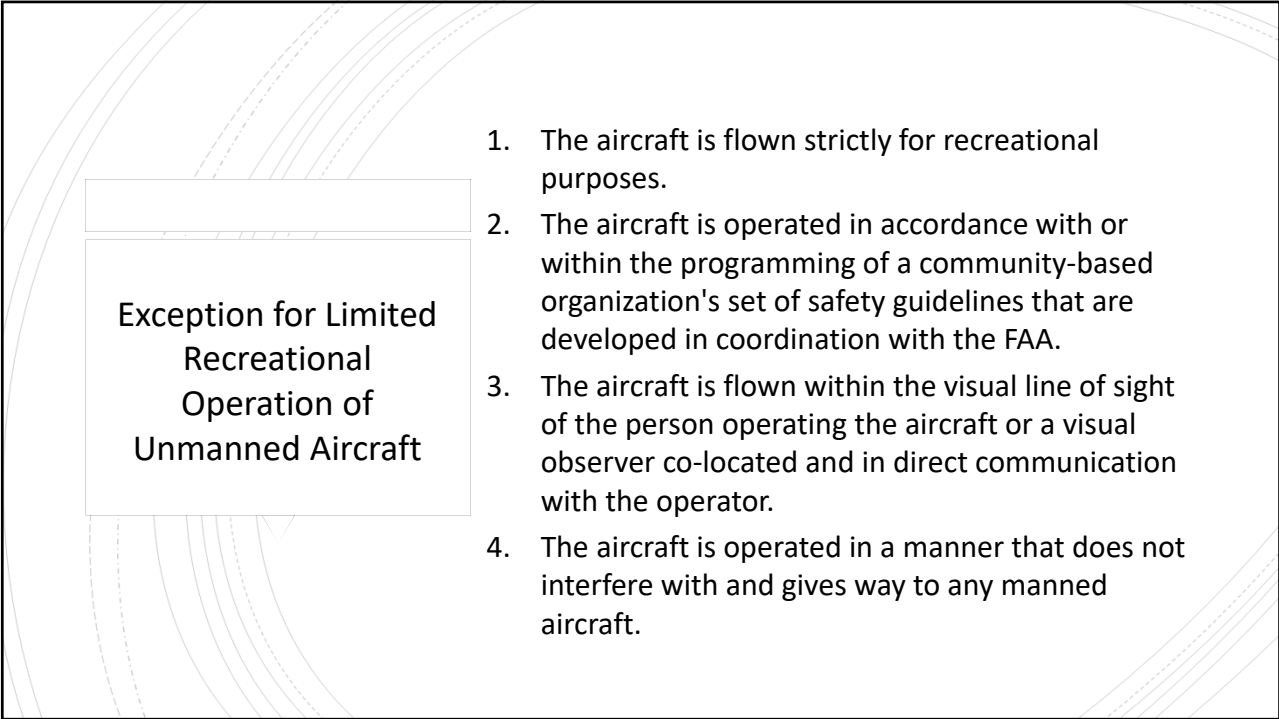
- The FAA repealed the Special Rule for Model Aircraft and released updated guidance for recreational flights in May of 2019.
- The new requirements are expected to be fully implemented by summer 2019.

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Recreational/Educational Flyers & Modeler Community Based Organizations

- Until recently, recreational pilots were not required pass an aeronautical knowledge and safety test.
- Recreational pilots were allowed to fly under “The Special Rule for Model Aircraft”.
- Educational and Research pilots are currently still allowed to fly under recreational guidelines.
- The FAA established eight statutory conditions for recreational flyers to operate under the “Exception for Limited Recreational Operation of Unmanned Aircraft”. Otherwise, the recreational operations must be conducted under 14 CFR part 107.

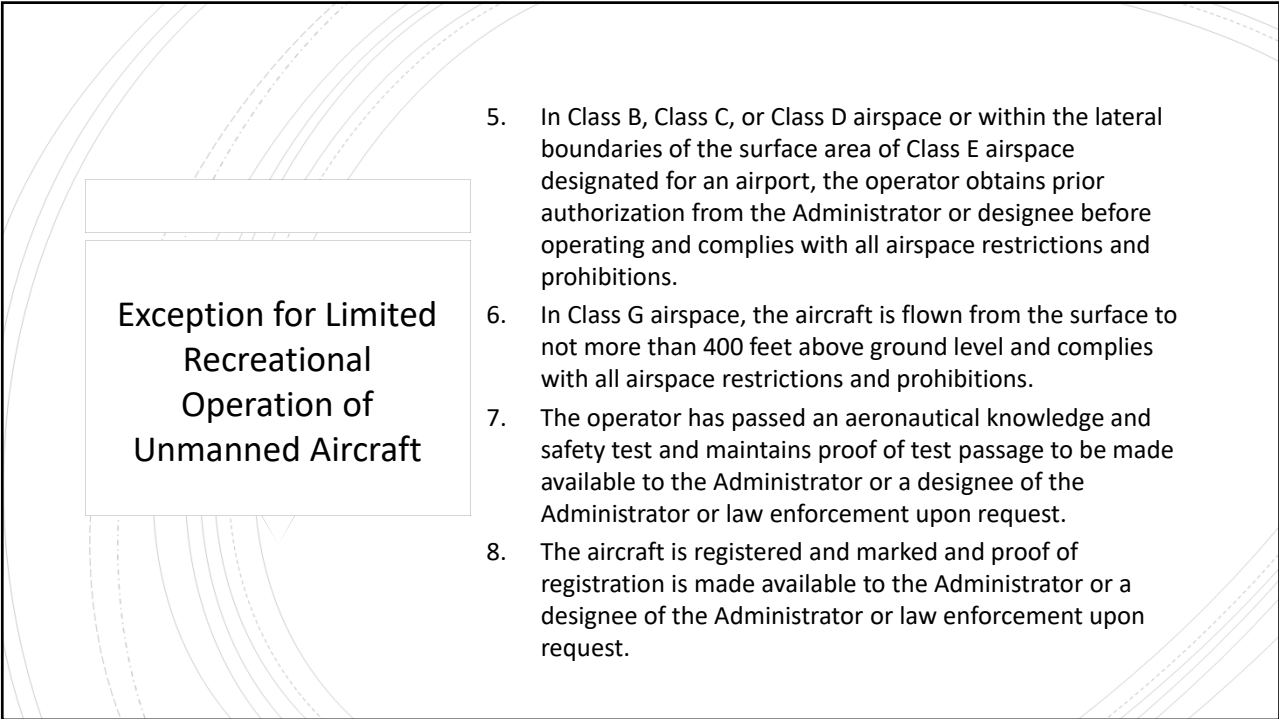
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**Exception for Limited
Recreational
Operation of
Unmanned Aircraft**

1. The aircraft is flown strictly for recreational purposes.
2. The aircraft is operated in accordance with or within the programming of a community-based organization's set of safety guidelines that are developed in coordination with the FAA.
3. The aircraft is flown within the visual line of sight of the person operating the aircraft or a visual observer co-located and in direct communication with the operator.
4. The aircraft is operated in a manner that does not interfere with and gives way to any manned aircraft.

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**Exception for Limited
Recreational
Operation of
Unmanned Aircraft**

5. In Class B, Class C, or Class D airspace or within the lateral boundaries of the surface area of Class E airspace designated for an airport, the operator obtains prior authorization from the Administrator or designee before operating and complies with all airspace restrictions and prohibitions.
6. In Class G airspace, the aircraft is flown from the surface to not more than 400 feet above ground level and complies with all airspace restrictions and prohibitions.
7. The operator has passed an aeronautical knowledge and safety test and maintains proof of test passage to be made available to the Administrator or a designee of the Administrator or law enforcement upon request.
8. The aircraft is registered and marked and proof of registration is made available to the Administrator or a designee of the Administrator or law enforcement upon request.

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Most Significant Changes



Recreational flights in controlled airspace are (temporarily) only allowed in limited fixed sites. The FAA posted (to their website) approved sites where recreational pilots are allowed to fly.



FAA air traffic facilities should no longer be contacted for airspace authorization because facilities will no longer accept requests to operate recreational UAS in controlled airspace.



Recreational operators must pass an aeronautical knowledge and safety test, maintain proof they passed the test, and be able to provide evidence if requested. *The FAA is currently developing an aeronautical knowledge and safety test for these purposes.*

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Certified Remote Pilots

- Drones weighing less than 55 pounds can be flown for work or business following the Part 107 guidelines.
- There are three main steps to fly under Part 107:
 - Learn the rules;
 - Become an FAA-Certified Pilot by passing a knowledge test to earn the Remote Pilot Certificate;
 - Register your drone with the FAA (same registration process for recreational flights).

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Common Rules Flying Under Part 107

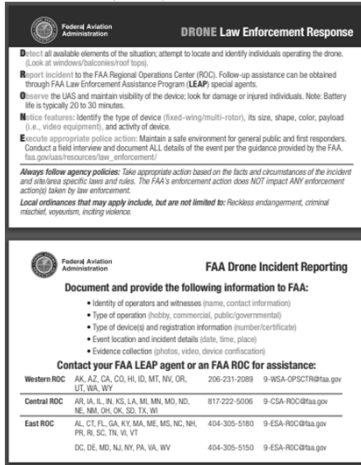
- Must weight less than 55 lbs;
- The drone must remain in visual line of sight of the pilot in command and/or within the visual line of sight of an observer;
- May not operate over any persons not directly participating in the operation.
- Daylight operations only or civil twilight (30 minutes before or after official sunset – with appropriate anti-collision lighting);

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Common Rules Flying Under Part 107

- Must yield right of way to other aircraft;
- Maximum ground speed of 100mph;
- Maximum altitude of 400 ft above ground level or, if above 400 ft above ground, remain within 400 ft of a structure;
- Operations in certain airspace require permission from the FAA;
- Preflight checks to ensure the drone is safe for operation.

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Public Safety & Government

- Public Safety Agencies, such as Law Enforcement, are in the best position to deter, detect, and investigate unauthorized or unsafe UAS operations. While drones can serve as a useful tool, these agencies also have an important role in protecting the public from unsafe and unauthorized drone operations.
- The FAA developed a law enforcement checklist that aids officials in handling complaints and identifies steps to take in responding to a situation involving a drone.

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Airspace Restrictions

- Flying drones in and around stadiums is prohibited starting one hour before and ending one hour after the scheduled time of certain sporting events.
 - Major League Baseball
 - National Football League
 - NCAA Division One Football
 - NASCAR Sprint Cup, Indy Car, and Champ Series races

Specifically, UAS operations are prohibited within a radius of three nautical miles of the stadium or venue.

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Airspace Restrictions

- Drone operators should avoid flying near airports because of other air traffic; however, there are some options.
 - Option 1: If you have a Remote Pilot Certificate and are following part 107 rules, you must get permission from air traffic control to fly in controlled airspace. The FAA can grant permission two different ways – LAANC or DroneZone.
 - Option 2: Recreational flights in controlled airspace are only allowed in limited fixed sites; however, this is **temporary**. Eventually the FAA will upgrade the LAANC system so that recreational operations can get automated airspace authorizations to fly in controlled airspace. This system is currently only available for certified Part 107 drone pilots.
 - Option 3: If you are a public entity (law enforcement or government agency), the FAA may issue you special permission to fly in a designated location near an airport.

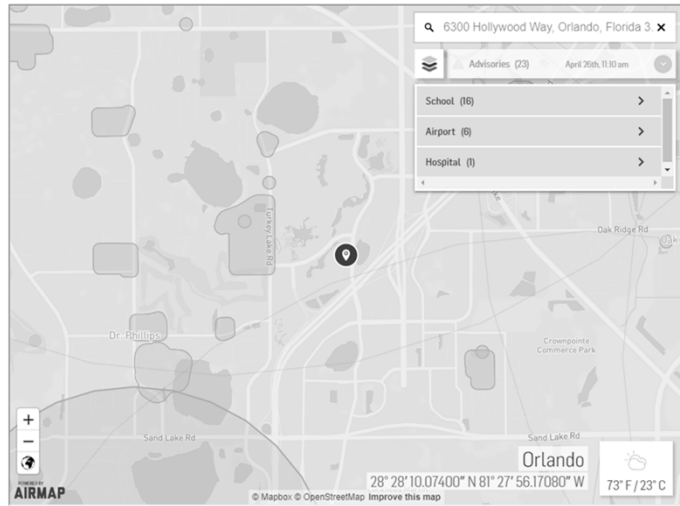
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Airspace Restrictions

- Drones are prohibited from flying over designated national security sensitive facilities. Examples include military bases, national landmarks, and nuclear power plants
- Restricted or special use airspace is for certain areas where drones and other aircraft are not permitted to fly without special permission.
- The airspace around Washington, DC is more restricted than any other part of our country.

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Know Before You Fly!



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Poll: What types of drone flights do you see on your campus?

- Recreational
- Research
- Academic
- Commercial
- All
- None

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Drones at UA



Aerial Mapping



Thermal Mapping

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Drones at UA



Brain-Drone
Racing League



Student Organizations

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Drones at UA



Marketing and Recruitment

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Considerations in Drone Policy Development

Who is flying and where?

What is the risk and who assumes the risk if there are damages to property or people?

Who decides when, where and who can fly?

Who has jurisdiction?

What is the process for requesting to fly or purchase a drone?

How many drones does your campus have and how are they being used?

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Considerations in Drone Policy Development

Determine your policy first and then determine how to implement the policy.

Who and where is the policy applicable (on campus, off campus, or both)?

In addition to FAA guidance, do you have any local or state laws or campus policies to consider that should be incorporated into the policy?

Is there a designated space where pilots should or should not fly?

Who are the key stakeholders and what are their roles?

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Considerations in Drone Policy Development

- Are recreational flights permissible on campus?
- Requirements for 3rd party drone usage (insurance, liability, etc.).
- Is your campus under any airspace restriction?
- How will you coordinate flight requests for academic, research and/or recreational missions?
- When is it appropriate to interject or say “no” to a flight request?

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Drone Policy Development at UA

What is the purpose of your policy?

- UA’s policy is to ensure that UA and the UA community acquire and operate a drone efficiently, safely ethically, and in adherence to applicable laws and regulation?

Who and where is the policy applicable to?

- All flight plans (on and off campus) are coordinated through our office.
- UA employees or students that operate a drone as part of a University program must register their equipment, obtain proper certifications from the FAA and submit a UAS flight request form to our office.

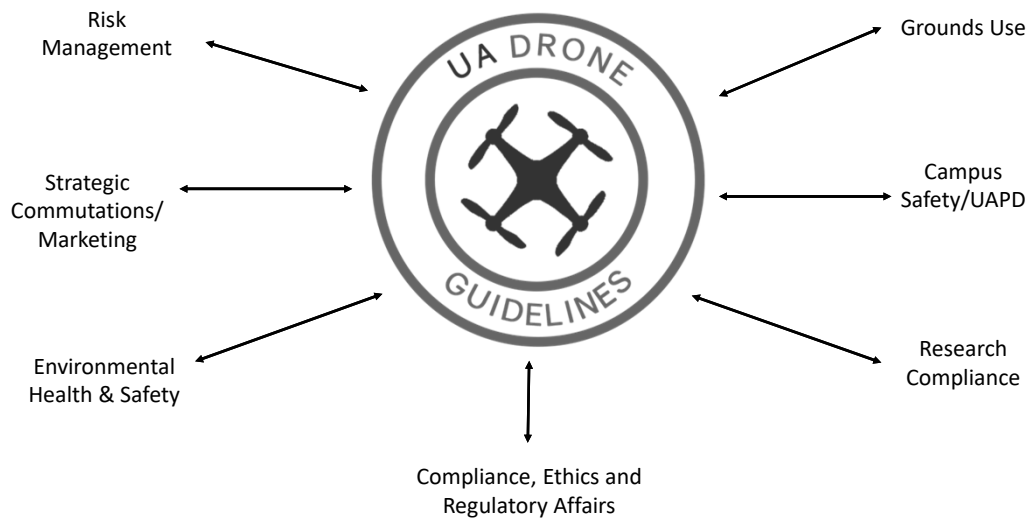
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Drone Policy Development

- Clearly define the drone operator's responsibilities.
- Incorporate FAA regulations and procedures to follow if there is an accident or injuries.
- Identify areas on campus where flights may be prohibited.
- Include the process of tracking drones purchased using University funds.
- Outline enforcement and penalties for noncompliance.
- Have a coordinated and efficient process for pilot to submit a flight request.
- Identify the key players reviewing the flight request.

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Considerations in Drone Policy Development



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Poll: Do you have a drone policy


- Absolutely.
- Yes, but it is in its infancy stages.
- No, but we are trying to develop one.
- No, what is a drone?

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Flight Requests at UA

- Flight requests are submitted via DocuSign. Users may upload required documentation to the flight request.
- Academic flights, at certain locations, can be streamlined if pilots and equipment have been previously vetted. In this case, the flight request becomes a notice of flight.
- Purchase requests are also submitted via DocuSign.
- Flight requests and purchase requests are tracked

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What Have We Learned So Far?

- Some litigation can inform your policy and procedures. For example, Singer v. City of Newton (case declaring local drone law illegal).
- This was important to us because it challenged the “registration process” for drones. The court ruled this particular ordinance was conflict preempted.
- As a result of this case, we changed the language in our policy from “register” to “request”.

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Ch-Ch-Ch-Changes

- The regulations are constantly changing with little to no communications of those changes. Be aware and constantly peruse the regulations.
- In October of 2018, the President signed the FAA Reauthorization Act of 2018. The Act establishes new conditions for recreational use of drones and immediately repealed the Special Rule for Model Aircraft.
- The FAA is evaluating the impacts of this change and has started implementation with recreational flights.

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What Have We Learned So Far?

Some people really hate drones but we can't just say no drone zone.

Some people want to take the drones down.

Not all flight plans are equal.

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	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p>Changes Coming in the Future!</p> <p>FAA Reauthorization Act</p> </div>	<ul style="list-style-type: none"> • Aeronautical knowledge and safety tests for recreational pilots. • Guidance on how the FAA will recognize community based organizations. • Guidance concerning operations of larger aircraft and commercial operations.
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Poll: What is your take on drones?

- Drones are cool and I can't wait to see where it goes from here!
- Shoot 'em down!
- It's complicated, but I guess I better get used to it.

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WHERE LEGENDS ARE MADE

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