



Drone Photography

A drone isn't just a camera in the air—it's a tool that allows photographers to reveal patterns, relationships, scale, and perspectives that are impossible to see from the ground.

Why did I buy a drone? For one thing, having shot from a helicopter I knew I loved low altitude aerial photography, but each heli trip cost me about 400 dollars, and that was splitting the cost between three or four people. Who can afford to do that very often?

For another, I was forever looking out across the landscape wanting to see what was “over there” but not able to hike distances. So... I bought a drone. To be perfectly honest, it was a long time before I flew it other than shooting some images of the community garden at my church. I had drone anxiety. It was expensive – what if I crashed it? What if I wasn't a good pilot? What if...

When I first got it, I had no idea where it would take me. I didn't know about the laws and complexities involved in drone ownership. Make no mistake. Drones are not toys. At least most of them aren't. The FAA is serious – drones are unmanned aircraft. If someone shoots them out of the sky, it carries the same penalties as destroying any other aircraft, manned or unmanned. And as a pilot you are responsible for ensuring the safety of property and persons around your drone.

My goal tonight is to inform you about the ins and outs of drone ownership, but

also to encourage you to investigate flying if you are interested.

Agenda

- Types of drones
- Recreational flying
- Flying under Part 107 Certification
- DJI Ban
- Composition
- A few shots
- Questions?



What we are going to cover. So, on to types of drones...

Camera Drones

- Camera Drones – what all we photographers use, though movie companies have bigger fancier ones.
- DJI is the undisputed leader in the field.
 - DJI Mini 4 or 5
 - DJI Mavic 2, 3, or 4
 - DJI Air 3





FPV – First Person View Drones

- Flown using goggles.
- Made for speed and immersive flying.
 - DJI Avata 2
 - iFlight Nazgul Evoque F5
 - Nazgul Evoque F5 with DJI Goggles
 - Custom racing drones
- Can go from 0 to 60 in less than a second
- Used for fast-moving chase scenes in films, sports broadcasts, ski videos, etc.

They are harder to fly but produce some very dynamic video. Some use them for racing.

Flown using goggles.

Made for speed and immersive flying.

DJI Avata 2

iFlight Nazgul Evoque F5

Nazgul Evoque F5 with DJI Goggles

Custom racing drones

Can go from 0 to 60 in less than a second

Used for fast-moving chase scenes in films, sports broadcasts, ski videos, etc.

You may have seen videos of drones speeding up a mountain, then flying straight down the side of the rocks at breakneck speed – these are likely taken by a FPV drone.

Racing Drones

- Extremely fast
 - Often 80–100+ mph)
- Minimal cameras
- Built for competition
- Require serious flying skills
- Organized racing events



A drone race course is the aerial equivalent of a slalom ski course or an autocross track. Pilots fly lightweight FPV (First Person View) racing drones through a series of gates, flags, arches, and other obstacles as quickly as possible while trying to complete every required element in the correct order.

Three-dimensional: Unlike car racing, the course isn't confined to the ground. Pilots fly up, down, around, and through obstacles, making full use of all three dimensions. Inflatable gates, PVC gates, flags, elevated hoops, tunnels, and dive gates define the route. Missing a gate or flying them out of sequence usually results in penalties or disqualification.

"Imagine a roller coaster suspended in midair, but instead of riding it, you're flying it at 60 to 100 miles per hour using only a live video feed from the drone."

"Think of it as Formula One meets aerobatics. The pilot isn't just turning left and right—they're flying a carefully choreographed path through three-dimensional space.

<https://www.youtube.com/watch?v=bZvNLC12R0&t=207s> starting at 1:25

Industrial Drones

- Over 55 lbs, and very expensive!
 - Inspections
 - Surveying
 - Public safety
 - Search and rescue
 - Crop dusting, etc.
- Can cost anywhere between \$6000 and \$250,000



Industrial drones do not fit in the FAA small unmanned aircraft designations. They weigh 55 lbs or more and fly under **14 CFR Part 91** – the general operating rules for aircraft. **Agricultural spraying or dispensing** uses **Part 91** together with **Part 137 (Agricultural Aircraft Operations)**, plus FAA exemptions as applicable. They also include heavy-lift construction drones, Large cargo or delivery drones Industrial powerline inspection platforms carrying large sensors.

While there are several classifications of drones, sometimes they overlap. A movie company may have a very expensive camera drone, over 55 pounds. Technically, it is Industrial, though photography or cinematography is its primary purpose.

Some racing drones are very small, and cross over into our next classification.

Tiny Whoop Drones

- Built for indoor flying and cost not much over \$100
 - Palm-sized
 - Have propeller guards
 - Generally under 100 grams



The term "**Tiny Whoop**" started as a brand name and became a generic nickname for an entire class of small FPV drones.

Around 2015–2016, FPV enthusiast Jesse Perkins modified a small toy quadcopter by adding an FPV camera and video transmitter. He called it **Tiny Whoop** because:

It was **tiny**—small enough to fly indoors.

"Whoop" was inspired by the circular propeller guards, which look like little hoops (or "whoops") around the propellers.

The idea caught on rapidly. Pilots discovered these tiny drones were:

- Safe enough to fly indoors.
- Durable and inexpensive.
- Capable of surprisingly fast and exciting FPV racing.
- Today, many manufacturers make similar drones, and people commonly refer to the entire category as "Tiny Whoops," even when they aren't made by the original Tiny Whoop company.

Toy Drones

Not worth talking
about unless you
have a child under
the age of 10



Recreational or Commercial?

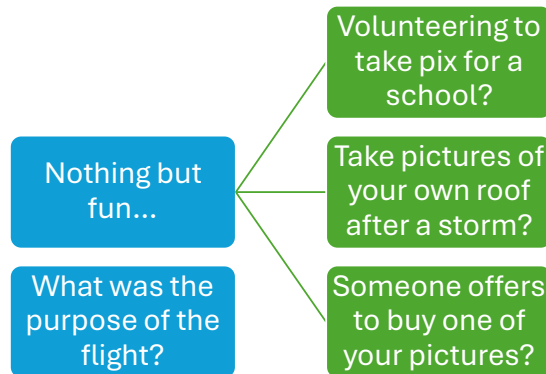
- FAA groups drone users into two types of pilots
 - Recreational pilots fly just for fun
 - Part 107 – Everyone else



There are two types of drone pilots – strictly recreational and Part 107 pilots. We will talk about both.

I took this shot at the Moonscape Overlook just west of Hanksville, UT. This is our workshop crew just after dawn on the first flying morning. I'm on the right with the controls, taking the picture. Someone asked if you could take a group shot with one of those Tiny Whoop drones – and the answer is that you can shoot group shots or selfies with any camera drone.

Let's Talk Recreational Flying



One mistake a lot of people make is thinking that if they aren't making money, they are a recreational pilot. The FAA doesn't look at it that way. If you do anything that can be considered commercial you need the Part 107 certification.

For instance, your neighbor is trying to sell his house. He asks you (as a favor) to throw your drone up and take a few aerial shots. Even though he isn't paying you, it's a commercial application, and you can't do it without certification. Penalties range from warnings to \$27,500 fines.

What matters is the purpose of the flight. Did you go specifically to take pictures for stock? Did someone ask you to take the pictures? If no, it's recreational. If yes, get the certification.

But suppose you were flying just for fun and got a killer shot – a friend sees it and wants to buy it for his wall. Can you sell it? YES! Because the purpose of the flight was for fun.

Before You Fly

- Pass the TRUST test and carry proof (free)
- Register your drone if necessary. \$5.00 for three years
 - Don't have to register under 250 grams
 - Watch out! Some batteries push the take-off weight to 250 grams
 - Over 249 grams go to FAA Drone Zone and register.
- Put the registration number on the drone
- Check the airspace – know when and where you can fly



Register your drone if necessary. \$5.00 for three years
Under 250 grams, don't have to register
250 or over, you go to FAA Drone Zone and register.
Watch out! Some batteries push the take-off

You must post your registration number on the outside of your drone, visible without any special tools

Pass the TRUST test and carry proof (free)

Pass the TRUST test and carry proof (free)

Check the airspace – know when and where you can fly

Where CAN you fly?

- Pretty much any class G airspace. People own the land – not the air above the land
 - Go out to West Texas and have a ball
 - Be careful to avoid stampeding livestock. Stay high and zoom in.
- You can get an approval in restricted airspace.
- BLM land is some of the most scenic and you can fly most of it!
 - Valley of the Gods
 - Alabama Hills
 - Bear's Ears
 - White Pocket
 - Million Dollar Highway
- Not National Parks or designated wildlife preservation areas

People complain that there's nowhere to fly in the US. I thought so too at first, but it's not true!

Farmland. The landowner owns the land, not the airspace, but be courteous

Golf Courses – not over people

BLM land most productive, particularly in Colorado, Arizona, Utah, New Mexico

Valley of the Gods

Alabama Hills

Bear's Ears

White Pocket

Million Dollar Highway

Citiscapes – again be careful.

Do NOT fly in National Parks or designated wildlife management areas, even if they are BLM lands.

You may be able to get LAANCE APPROVAL in restricted airspace.

You can apply for permission in some state parks, but do NOT fly in National Parks or designated wildlife management areas, even if they are BLM lands.



FAA Rules for Recreational Flight

- VLOS
- Visual Observer – It's ok to position a second person some distance out to extend the range
- Must have at least 3 statute miles visibility.
- At least 500 feet below and 2000 feet horizontally away from clouds.

Stay in VLOS – visual line of sight. You must be able to see your drone with the naked eye and be able to determine the orientation of the drone. Glasses or contacts ok, binoculars not!

FPV pilots :

"When an FPV pilot is flying through goggles, someone else usually needs to keep eyes on the drone. The pilot sees what the drone sees; the visual observer sees what the drone might hit."

This is one of the biggest operational differences between a typical camera drone pilot and a racing/FPV pilot.

Must have at least 3 statute miles visibility.

At least 500 feet below and 2000 feet horizontally away from clouds.

Visual Observer – It's ok to position a second person some distance out to extend the range – but that person must be in contact with you constantly and be able to see the drone from takeoff to landing. The purpose is to warn you of any manned traffic or obstacles.

More FAA Rules

- Yield right of way to any manned aircraft
- Fly no higher than 400 feet AGL (Above Ground Level) – NO exceptions
- Controlled Airspace – Airports, the White House, Camp David, etc. Apply for LAANCE approval through your phone app.
- Nighttime flight – ½ hour after sunset to ½ hour before sunrise.

Yield right of way to any manned aircraft

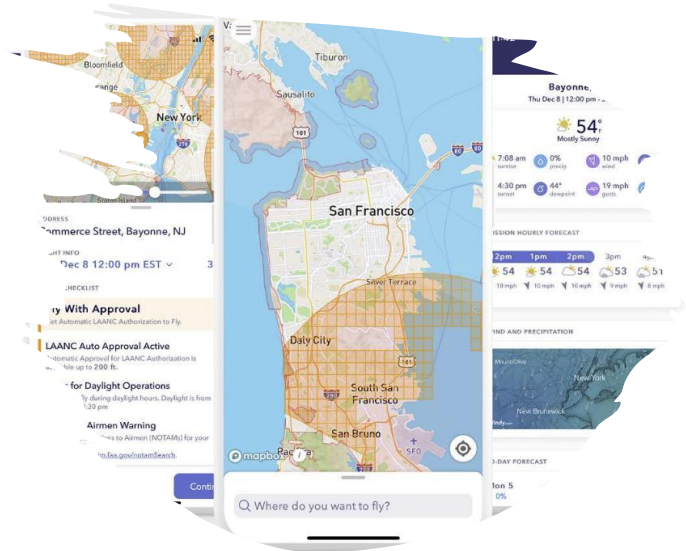
Fly no higher than 400 feet AGL (Above Ground Level) – NO exceptions

Controlled Airspace - Recreational drone pilots can get nearly real-time LAANC approval for flights in controlled airspace through one of several apps.

To fly during civil twilight or night, you must have anti-collision lighting that is visible for three statute miles.

Helpful Apps

- 1. B4UFLY
- 2. Air Control
- 3. AutoPilot
- 4. DroneBuddy
- 5. OpenSky



Whether you fly recreational or part 107, these apps are very helpful. You don't need more than one or two, because they duplicate functionality.

1. B4UFLY

Official FAA-supported drone safety app.

Shows controlled airspace, TFRs, national parks, military operations areas, and other restrictions.

Good for a quick "Can I fly here?" check.

Free.

2. Air Control

Formerly known as Aloft.

Provides LAANC authorizations where available.

Shows airspace classes, TFRs, NOTAMs, and advisories.

Popular with both recreational and Part 107 pilots.

3. AutoPilot

Excellent airspace visualization.

Supports LAANC requests.

Includes mission planning tools and weather information.

4. DroneBuddy

Displays airspace restrictions and weather.
Includes sunrise/sunset information.
Useful for recreational pilots.

5. OpenSky

Easy-to-read airspace maps.
Supports LAANC authorizations in many locations.
Good for quick flight checks.

Part 107 Certification

- If it's not recreational, it requires certification
- Must register the drone as commercial
- Why go for it?
 - You can make money
 - You can fly over people
 - You can fly up to 400 feet over manmade structures
 - Other special permissions
 - Bragging rights.



If it's not recreational, it requires certification

If anyone asks you to fly

If the flight is even remotely tied to a commercial enterprise

Must register the drone again as commercial

I had my drones registered as a recreational aircraft.

Had to cancel that and reregister as commercial

Why get the certification?

- You can make money taking real estate aeriels or photographing events
- May be able to get a waiver to fly BVLOS
- You can fly over people and moving vehicles following some pretty strict rules
- You can volunteer for schools or events
- You can fly up to 400 feet over a building as long as you stay within 400 feet horizontally.

- You can get approval to fly over the grid altitude in restricted airspace
- Bragging rights



How Hard is It?

- Stuff the average drone user will never need
 - Read sectional charts
 - Know runway and taxiway signage
 - Landing approach for downwind run
- But also a lot of important info

It's geared for professional pilots – Industrial purposes.. You have to learn to read FAA Sectional charts, know about airport runway designations and signage, etc. I can't see why those are necessary for a drone pilot. But it also includes important information like weather, airspace types and when you have to get authorization or waivers, etc.

What Does it Cost?

- \$175 per attempt, so study hard.
- I took an online class, which cost me another \$150, but it was worth it.

\$175 per attempt, so study hard.

I took an online class, which cost me another \$150, but it was worth it. I tried just studying on my own, and did fine on regulations,.

But sectional charts are a bear, and when I go to them I wasn't doing well until I signed up for the class. The class included instruction, quizzes after each lesson, flash cards for study, and several full-length practice tests.

You might ask, "Is it worth it?" To me and millions of other aerial photographers, yes.



DJI Ban

- Not so scary
- Only affects drones that have not been approved
- Firmware updates extended to 2029
- Drones are readily available
 - Amazon
 - B&H

You go on FB and read all the hype about the “DJI Ban?” People tell you that the government is going to brick your drone. People will say you can’t get security updates. People misunderstand what it’s all about, and they are wrong.

- Scare tactics
- I don’t know how many people have asked me how or where I got my Mavic 4 Pro – Amazon next day service.

It just bans new drones from foreign countries. Those that have already been approved can still be sold in the US. Firmware updates have been extended into 2029, so if you want a DJI, don’t be afraid to get one! I’ve talked to people who ordered from Korea and had a hard time getting them through customs. Get yours through Amazon or B&H.

Don’t despair – DJI is still fighting. There’s an ongoing court case to overthrow the ban.



It's a New World

- Ground photography is about finding a viewpoint.
- Drone photography is about creating one.
 - Height Becomes a Composition Tool
 - Foregrounds Matter Less
 - Geometry Becomes More Important
 - Subject Separation Is Easier
 - Scale Is Different

Ground photography is about finding a viewpoint. Drone photography is about creating one.

When you're on the ground, you're limited to places your feet can take you. You work with existing perspectives, looking for the best angle, foreground, light, and background from a relatively fixed height.

With a drone, you gain a third dimension—altitude. Instead of asking, "Where should I stand?" you're asking, "Where in three-dimensional space should the camera be?"

Key Differences

1. Height Becomes a Composition Tool

On the ground, moving a few feet can change a composition.

With a drone, moving up or down 20 feet can completely transform it:

Low altitude emphasizes depth and leading lines.

Medium altitude often reveals relationships between subjects.

High altitude turns scenes into patterns, shapes, and abstractions.

2. Foregrounds Matter Less

Ground photographers often rely heavily on foreground elements to create depth.

Drone photographers frequently compose:
With shapes and patterns
Using rivers, roads, shorelines, and field boundaries
Through subject isolation rather than foreground interest

3. Geometry Becomes More Important

From above, scenes often become graphic designs:

Lines

Curves

Repetition

Symmetry

Negative space

Things that look ordinary from the ground can become striking compositions from the air.

4. Subject Separation Is Easier

A drone lets you position the background exactly where you want it.

You can:

Move laterally to separate overlapping elements

Raise altitude to simplify backgrounds

Change the relationship between subjects without physically approaching them

5. Scale Is Different

Ground images often show what something looks like.

Drone images often show:

How big something is

How it relates to its surroundings

Patterns that can't be seen from ground level

A lone tree, lighthouse, or farmhouse can become much more powerful when surrounded by miles of landscape.

A Memorable One-Liner

"Ground photography is usually about photographing objects. Drone photography is often about photographing relationships—how objects connect to the landscape around them."

That distinction helps people understand why strong drone images often feel very different from traditional landscape photographs.

The Biggest Challenge

- Experienced drone photographers constantly ask:
 - Should I go higher?
 - Should I go lower?
 - What happens if I move 50 feet left?
 - What does the scene look like straight down?
 - Can I simplify this composition?
- The drone's greatest advantage isn't altitude—it's the ability to place the camera almost anywhere.

Many new drone pilots simply fly up and take a picture.

The drone's greatest advantage isn't altitude—it's the ability to place the camera almost anywhere, but that's more difficult than it sounds. I'm still learning, and I haven't even started practicing video yet.

Experienced drone photographers constantly ask:

Should I go higher?

Should I go lower?

What happens if I move 50 feet left?

What does the scene look like straight down?

Can I simplify this composition?



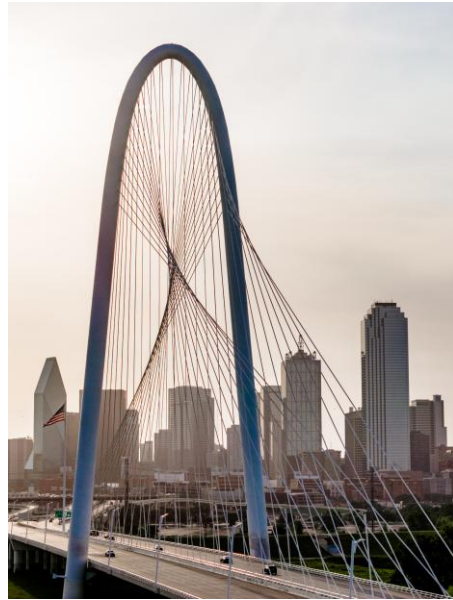
This could be setting the scene for a series of shots taken at the park – sort of an overview,.



This is not my shot – It's one Mary Ruehle sent me after she went out to Western Bell Farms. Drones are great for getting selfies without turning yourself into a pretzel.







Margaret Hunt Hill bridge and the promenade next to it. Alan Abair and I met first thing in the morning so we could shoot before the prom was full of people. That left us shooting the city with the sun in our eyes. I'd love to go back in the evening to get the lights of the city at dusk, but we wouldn't be able to hover over the walkway.

The cityscape was taken with the Mavic 4 drone's 6x camera – that gave me the compression you see here. It's one of the advantages of having multiple cameras on your drone.



The last time I delivered this class, I got some questions about whether it's ok to photograph private property. The rules are clear that anything in public is fair game legally, but you have to keep privacy laws and ethics in mind. For instance, it's ok to fly in your neighborhood and cross people's yards, even the back yards. It's not ok to hover over someone's back yard and spy.

I don't think any of us would hesitate to shoot a building. City (architectural) photography is something we do without qualms. This image is much like that – it's just taken from the air.



Grounds of the Mars research station – on the top of a plateau in Utah. The Mars Desert Research Station (MDRS) is the world's largest and longest-running Mars analog habitat, designed to simulate living and working conditions on Mars for research and training purposes.

There are several building up on the plateau, and while you can fly around and take all the pictures you want to, you aren't allowed to fly over or photograph their installation.



Utah badlands



Flying from Moonscape Overlook, Hanksville