

Drone Part 1 – 101/Introduction & Fundamentals

Community Ed Summer/Fall 2025



PICTURES OVER
STILLWATER



By Greg Schulz – Pictures Over Stillwater

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Drone Basics Beginner – Drone Fundamentals

Flying Smart, Flying Safe – Introduction

- Greg Schulz – greg@picturesoverstillwater.com
 - Founder Pictures Over Stillwater (and Pictures Over Midwest ;))
 - Also founder of Server StorageIO™ an IT/Cloud Technology Consultancy
 - Chief Pilot/Drone Operator, Photographer, Videographer (indoors & outdoors)
 - Regular cameras and drones, FPV, 360, Thermal, photogrammetry, autonomous
 - Have flown in various airspace and conditions around twin cities, MN & WI
 - Events, inspections, construction, engineering, real-estate, SAR, virtual tours
 - FAA Part 107 certificate since 2018 (current), OOP & OOMV waivers & airspace authorizations
 - Drone 6,000 flts, and over 1,100 air hours, about 3,000 sUAS miles flown
 - MnDOT Aeronautics Licensed for commercial work in Minnesota
 - FAA Safety Team (FAASTeam) of Minnesota Lead Rep and Drone Pros.
 - Learn more at <https://picturesoverstillwater.com/links> (also on FB, Insta, X, LinkedIn)



The Wonderful Wide World of Drones and Their Uses

Flying Smart, Flying Safe – Big Picture and Background



The Wonderful Wide World of Drones and Their Uses

Flying Smart, Flying Safe – Sampling of How Drones Used Today

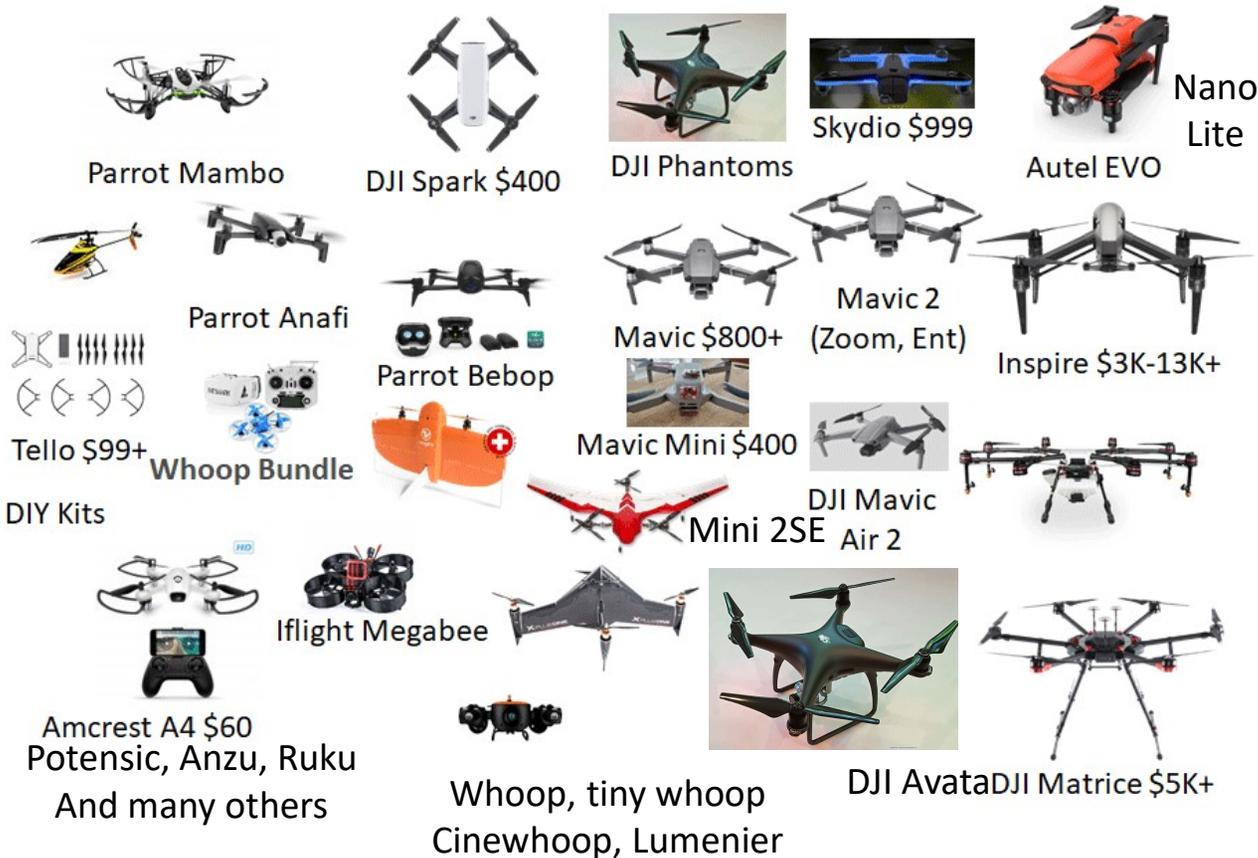
- Hobby and Recreational (Just for Fun, No Betterment of self or for others)
 - Flying for fun, home build DIY, Racing, RC Airplanes & Helicopters
- Education / Science Technology Engineering Math (STEM), Continuing Learning
 - Elementary & Middle School, High School, College, Com Education
- Non Hobby/Recreational (e.g. Commercial and others)
 - Media Entertainment (News, Print, Online, TV, Commercials, Events)
 - Real Estate (Commercial & Residential), Virtual Tours
 - Property Development & Management, Construction
 - Agriculture, Farming, Forestry, Crop Spraying
 - Surveys, Inspections (Towers, Buildings, Roofs)
- Military, First Responders, Government
 - Security and Overwatch, Emergency Management, SERT
 - SAR, Fire Suppression & Support, Accident Reconstruction
 - Engineering, Inspections, Imaging, Design, Construction
 - Wildlife and Natural Resource Management



Image via Jeremy Williams

The Wonderful Wide World of Drones and Their Uses

Various Types of Aircraft (Drones) aka UAS, UAV



Wide World of Drones

- Unmanned, Remote Operated
- Fixed Wing and Rotor
- Single, Dual, Quad, Octa
- Some have cameras or add-ons
- Manual control vs. GPS assist
- DIY builds vs. Turnkey
- Various functionality & size
- Different performance & cost
- Variable battery/flight time
- Indoor, Outdoor, FPV, Racing
- Remote ID (RID) capable
- Simulators and skills tools
- Hobby or commercial
- ***What do you need to do?***

Dronerds, B & H, Getfpv, DJI, Autel, Amazon, Firehouse

Drone Basics Beginner – Drone Fundamentals

Flying Fun, Flying Smart, Flying Safe - #Dronesforgood

Wide World of Drones

- ✓ Unmanned Aerial Systems/Vehicles
- ✓ Singles, Quads, Rotor, Fixed Wing
- ✓ Tiny, Small, Medium, Large, Very Large
- ✓ Racing, Aerobatics, FPV, GPS, Camera
- ✓ DIY, Kits, Hobby/Recreate, Commercial

Operate

- Equipment, apps, software tools
- Aircraft, controller, display, batteries
- Pre (and post) flight activities
- Basic flight control operations
- Practice, using simulators

Aviate

- License/Certification (TRUST, 107)
- Aircraft Registration (DroneZone)
- Insurance Considerations
- Safe Flying Outdoors (and indoors)
- Rules of the road and air



Planning, Flying Safe

- When to fly (WX, TFRs, day/night)
- Weather to fly (wind, ceiling, visibility)
- Where to fly (type of airspace)
- Airspace authorizations (LAANC)
- Where to fly from (ground restrictions)

Drone Basics Beginner – Drone Fundamentals

General Reminders – Importance of Safety & Compliance for Drones

Who Are You?

- Drone Enthusiast
- RPC/Pilot/Operator
- Photographer
- Videographer
- Photogrammetry
- Subject / Topic Specialist
(Real Estate, Construction, Agriculture, Journalist, Other)

Whats Your Intent/Objective

Hobbyist/Recreational
(e.g. TRUST cert & CBO
Fly just for fun, not for work
or anyone else or betterment)

Registration

No < 250g (.55lbs)

Yes >= 250g

RID = Yes if registered

Non-Hobby
(Part 107, Commercial & Fun
For others & Betterment
Ability for waivers & privs.
MnDOT License/Reg in MN)

Registration

Yes 0 to 55lbs

RID = Yes

Operating Regulations

Where to Fly
Airspace - UAS Regs, TFRs - FAA
Ground – Private, City, Cty, State, Fed

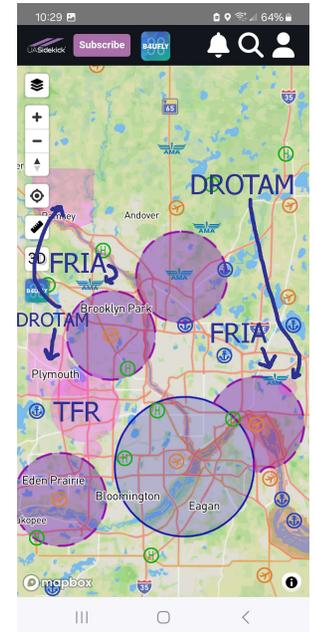
What & Where Is Your Subject

Weather Conditions
Day, Night, Wind
Clouds, Visibility

Drone Basics Beginner – Drone Fundamentals

General Reminders – Drone Rules and Regulations

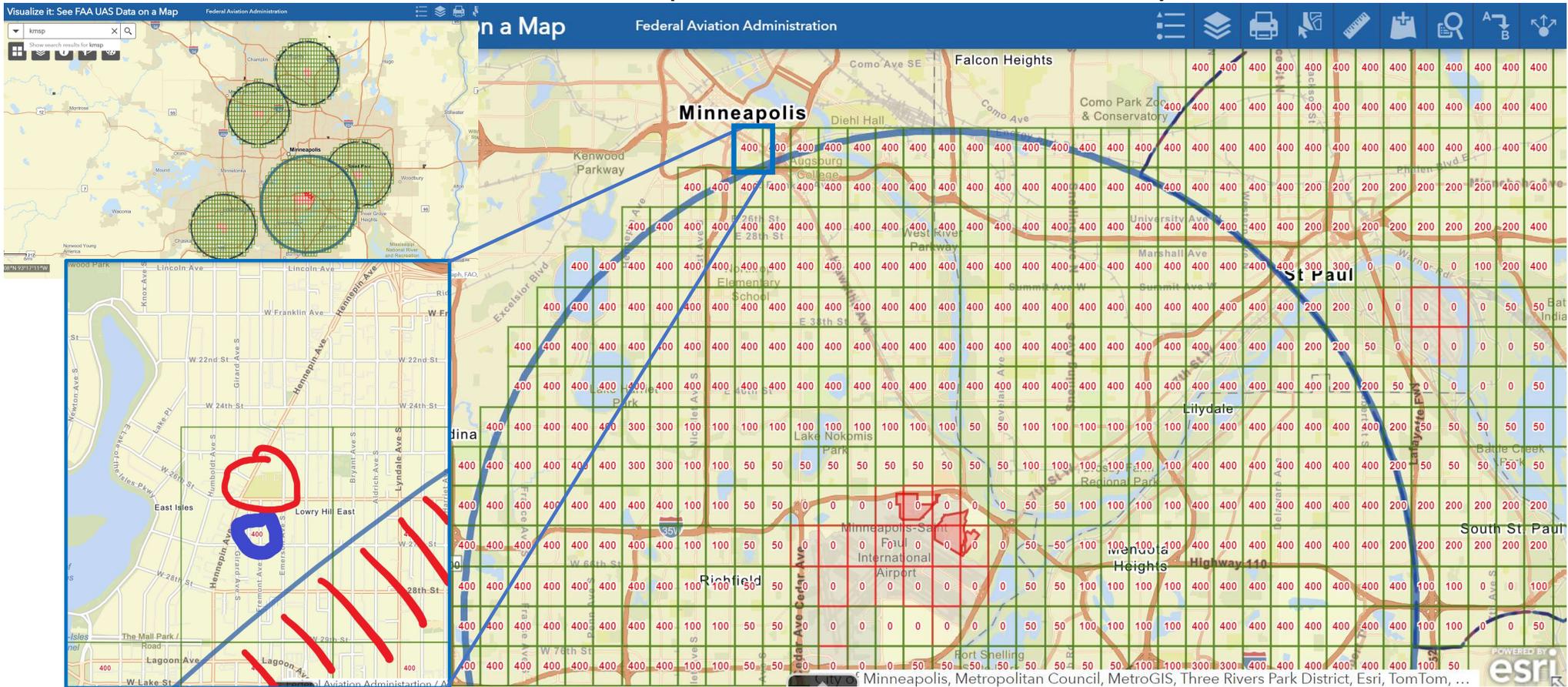
1. Follow FAA Part 107 or Hobby/Rec CBO / TRUST rules
 2. Drone must be registered (For all part 107, Hobby/Rec if > 249g)
 3. Drone must broadcast remote ID (If Registered)
 4. Pilot must have a certificate (TRUST or Part 107)
 5. Don't fly over people or moving vehicles without Waiver
 6. Pilot (or VO) have drone in Visual Line Of Sight (VLOS)
 7. Max altitude (alt) is 400' AGL in Uncontrolled Airspace
 8. Max alt is published alt for grid in controlled airspace
 9. Airspace Authorization (e.g. LAANC) required in controlled airspace
 10. Stay 500' below clouds (ceiling) and have 3 mile visibility
 11. Check for and DO NOT fly in TFR areas (Security, NFL/MLB/NCAA/NASCAR events)
 12. Use bright strobe lights required between sunset and sunrise
 13. Avoid reckless or dangerous operation, no alcohol or drugs before flight
 14. You are responsible for knowing the rules
- Use Apps like B4UFLY, UASidekick
Use Apps such as UAVForecast, B4UFLY, UASidekick, Foreflight, Aloft Aircontrol & others for planning and insight



Drone Basics Beginner – Drone Fundamentals

Flying Fun, Flying Smart, Flying Safe – Controlled Airspace Authorizations & Unlocks

Via FAA Visualize It – To Get LAANC Airspace Authorization Use B4UFLy, Aloft, & Others



Drone Basics Beginner – Drone Fundamentals

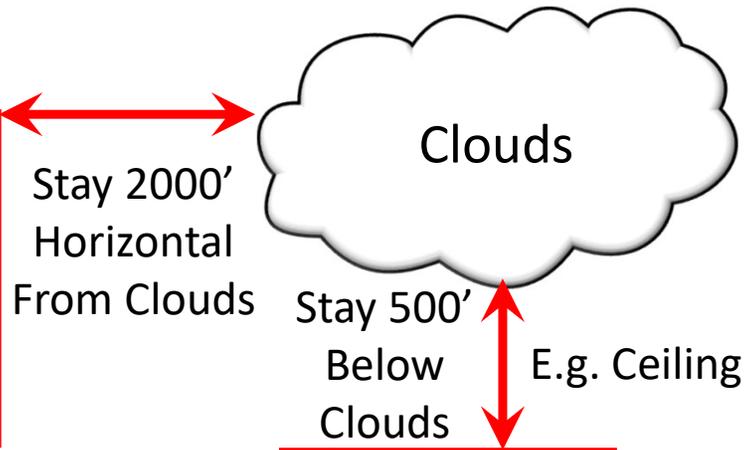
General Reminders – Drone Rules and Regulations



3 statute mile
visibility

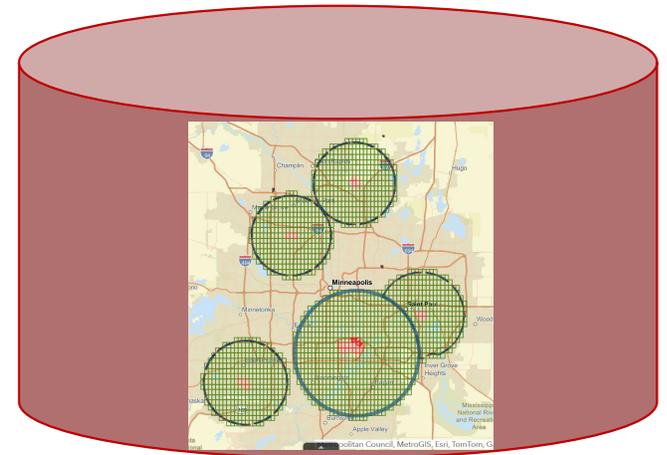


OOP/OOMV



Max Alt(1) 400' AGL
Unless Specified
Lower In Controlled
Airspace Grid

- What Airspace Will You Be Flying In?
- Controlled, Uncontrolled, Both?
- Airspace Authorization (LAANC) needed?
- Do you have or need any waivers?
- Any TFRs/MOAs or restricted areas?
- Any Ground Restrictions (e.g. Parks etc.)?



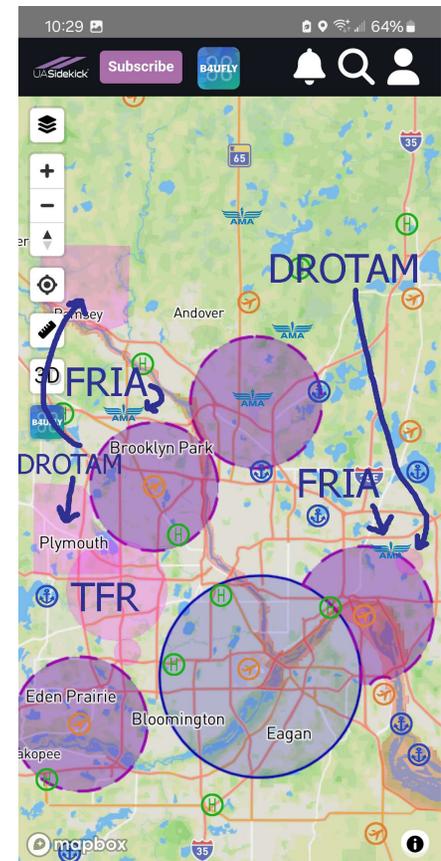
- (1) Hobby/Rec limited to 400' AGL in uncontrolled, All Alt in Controlled are absolute unless waiver or special authorization
- (2) OOP / OOMV requires waiver and/or special category of aircraft and avoid flying low and reckless

Drone Basics Beginner – Drone Fundamentals

General Reminders – Safety Tips For Before and During Flights

1. Follow FAA Part 107 or Hobby/Rec CBO / TRUST rules
2. Plan ahead and be prepared, use checklists:
 - Weather conditions (wind, temp, ceiling, visibility)
 - Location (Airspace, Ground Permissions, Obstacles)
 - Do you need and have Airspace Authorizations
 - Are there any TFRs or other airspace concerns
 - Do you have or need a VO, any Waiver considerations
 - Know your equipment and how to use it
 - Is your drone/aircraft and controller ready?
 - Are your batteries charged, strobe lights on?
4. Maintain situational awareness
5. Keep an eye on your aircraft, watch for other aircraft
6. Watch out for task saturation, use common sense

Use Apps such as UAVForecast, B4UFLY, UASidekick, Foreflight, Aloft Aircrontol & others for planning and insight



Drone Basics Beginner – Drone Fundamentals

Flying Fun, Flying Smart, Flying Safe – Various Options, Features, Functionalities

- Aircraft

- Integrated gimbal stabilized camera/sensor
- GPS enabled, optical and other sensors
- Size, weight, max take off weight (MTOW)
- Folding or non-folding arms, props, low noise props
- Transmission distance (keep in mind VLOS)
- **Remote ID (RID)** built-in or add-on module
 - 3/16/24 for all part 107 and Hobbyist A/C > 249g
- Safety features:
 - Simulators & training tools (e.g. DJI Virtual Flight and others)
 - High visibility lights (various colors)
 - Prop guards/cage, altitude & distance limits, learning modes
 - Return to Home (RTH) automatic, push button on controller
 - Low battery and signal loss, what to do
 - Obstacle Avoidance (OA), aka AI or Vision (forward, around, full 360)



DB120 RID Module



Smart Controller

Drone Basics Beginner – Links, Where To Learn More

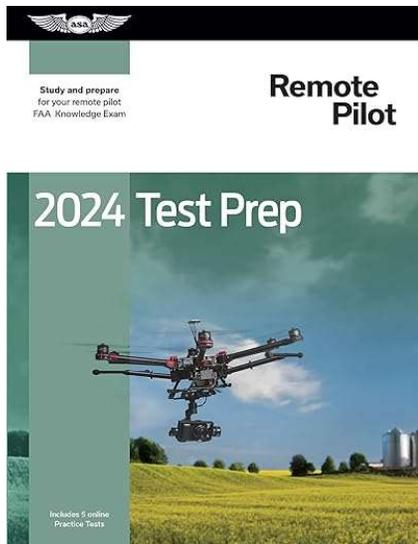
Flying Fun, Flying Smart, Flying Safe – Various Resources With More Information

Some Drone Sites and Resources

- Federal Aviation Administration (FAA) Drone sites [Faa.gov/uas](https://www.faa.gov/uas) & [faasafety.gov](https://www.faa.gov/faasafety)
- Drone registration for Hobby (> .55lbs) and part 107 (anything under 55 lbs)
<https://faadronezone.faa.gov/#/> (Watch out for fake or over priced sites)
- Rec/hobby 44809 TRUST test (online, its free, follow the links)
https://www.faa.gov/uas/recreational_fliers/knowledge_test_updates/
- B4UFLY (FAA Free App, Info, LAANC authorizations) - [faa.gov/uas/getting_started/b4uflly](https://www.faa.gov/uas/getting_started/b4uflly)
- DJI Virtual Flight Simulator (Free) - [dji.com/downloads/djiapp/dji-virtual-flight](https://www.dji.com/downloads/djiapp/dji-virtual-flight)
- MnDoT Aviation (Commercial Drone License & Registration [dot.state.mn.us/aero/drones](https://www.dot.state.mn.us/aero/drones)
- Facebook: The Mighty Drones – FPV Drone Racing [facebook.com/groups/themightydrone](https://www.facebook.com/groups/themightydrone)
- Facebook: MN sUAS [facebook.com/groups/1860070477555048](https://www.facebook.com/groups/1860070477555048)
- Pictures Over Stillwater <https://PicturesOverStillwater.com/links>
[facebook.com/PicturesOverStillwater](https://www.facebook.com/PicturesOverStillwater) [Instagram.com/PicturesOverStillwater](https://www.instagram.com/PicturesOverStillwater)

Drone Basics Beginner – Links, Where To Learn More

Flying Fun, Flying Smart, Flying Safe – Various Resources With More Information



Some Recommended Tools/Apps/Links:

- ✓ B4UFly and UAV Forecast and FAA Visualize It
- ✓ Aloft App (Air Control) – LAANC
- ✓ FAA TFR Map - tfr.faa.gov/tfr2/list.html
- ✓ [FAA The Recreational UAS Test \(Trust\)](https://www.faa.gov/uas/trust)
- ✓ [Skyvector.com](https://skyvector.com) & vfrmap.com
- ✓ <https://faadronezone-access.faa.gov/#/>
- ✓ <https://faasafety.gov>
- ✓ View more at PicturesOverStillwater.com/links

ASA 2025 Remote Pilot Test Prep (Via Amazon.com) - <https://amzn.to/3yPqPl1>

Part 107 Small Unmanned Aircraft Systems (small UAS) Recurrent

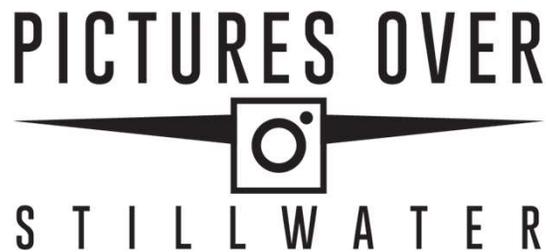
<https://www.faasafety.gov/gslac/ALC/CourseLanding.aspx?cID=515>

Part 107 Small Unmanned Aircraft Systems (small UAS) Initial

<https://www.faasafety.gov/gslac/ALC/CourseLanding.aspx?cID=451>

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Thank You



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