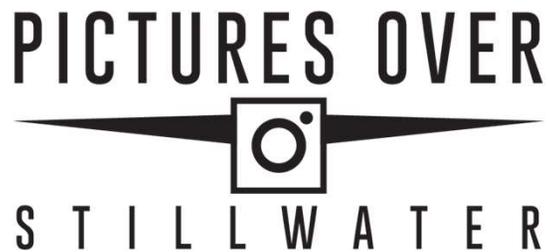# Drone Part 1 – 101/Introduction & Fundamentals
Community Ed Summer/Fall 2025

By Greg Schulz – Pictures Over Stillwater
FAA Part 107 & MnDoT Aeronautics Licensed Commercial Drone Operator
Professional Photographer, Videographer and FPV - MN FAASTeam Rep DronePro

PicturesOverStillwater.com/links | facebook.com/PicturesOverStillwater
vimeo.com/picturesoverstillwater | twitter.com/POStillwater | Instagram.com/PicturesOverStillwater
picturesoverstillwater.smugmug | youtube.com/@picturesoverstillwater

Drone Aerial Photography & Videography
Flying Smart, Flying Safe – Big Picture and Background

https://www.faasafety.gov/

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

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
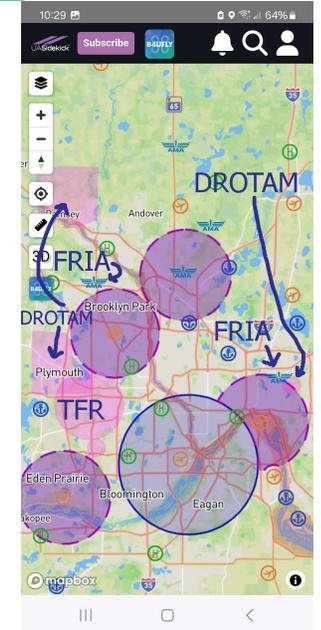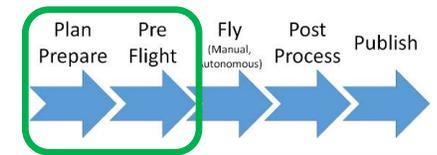Ground – Private, City, Cty, State, Fed

What & Where Is Your Subject

Weather Conditions
Day, Night, Wind
Clouds, Visibility

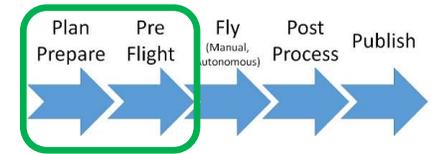# Drone Aerial Photography & Videography
General Reminders – Drone Rules and Regulations

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 Aerial Photography & Videography
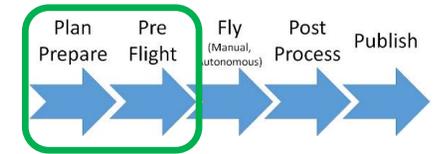Flying Smart, Flying Safe – Various Types of Panoramas

- Special Panoramas for large, high resolution images
  - Where viewer will be very close to the image when its enlarged to avoid pixilation
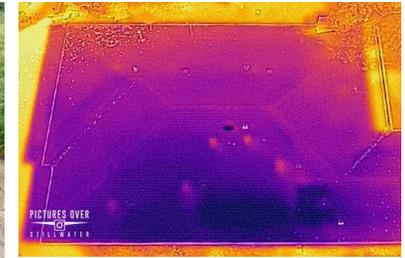
Drone Aerial Photography & Videography
Flying Smart, Flying Safe – The View is Different Up There
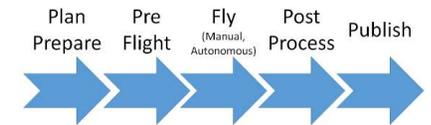

- Whats different from being up in the air?
  - Aspect ratios, perspectives and elevations
  - Seeing things from different view vantage points
  - Clouds, sky, water glare, shadows and reflections
  - Birds, aircraft and other drones in the area
  - Airspace and ground location restrictions
  - Staying out of the shot (or hiding) maintain VLOS
  - Wind speed and direction, stabilization, rain
  - Flying the aircraft plus taking photos/videos
  - Avoiding flying over people and moving vehicles
  - Rules, regulations, privacy, licensing
  - Where will aircraft fly-in to or crash?
  - ***More going on and be aware of: Task Saturation***

Drone Aerial Photography & Videography
Flying Smart, Flying Safe – Sample or Example Workflow

Plan -> Prepare -> Pre-Flight -> During Flight -> Post-Flight -> Post Prod -> Produce/Deliver

Plan: Determine where and when to fly, any permits, any airspace, any TFRs, any auth or waivers, weather forecast. What to capture, angles, POI, POV, shot lists, contacts, alternate plans, crew/staf, deliverables, content plan

Prepare: Gather Permits, authorizations, equipment, hw, sw, battery, waivers, LAANC, checklists

Pre-Flight: Run checklists, Inspection equipment (replace anything not flight ready), crew briefings, verify no TFRs, LAANC if needed, verify surrounding (people, obstacles, moving vehicles, lighting), weather conditions ok for flying, verify aircraft and apps (including settings) are ready, strobe lights on and batteries are charged.

During Flight: Monitor aircraft, leverage crew resources and communications, fly flight plan, watch weather. You are flying first, photographing and videoing secondary, stay focused on tasks, watch out for task saturation, see and avoid any manned aircraft and obstacles. Don't assume other drone operators will watch out for you.
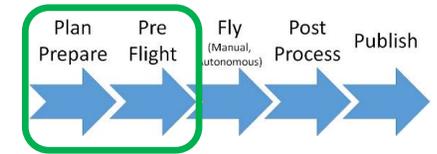
Post-Flight: Safe and stow equipment, let batteries cool before storing and charging, repair equipment, make any notes about repairs or incidents encountered during flight to follow up, offload images from MicroSD card or aircraft to other device. Rename folders and files as needed as part of workflow. Note some flight apps that download from aircraft to phone may not download everything.

Post Prod: Edit photos, videos, composite or process as needed, produce and deliver or publish images
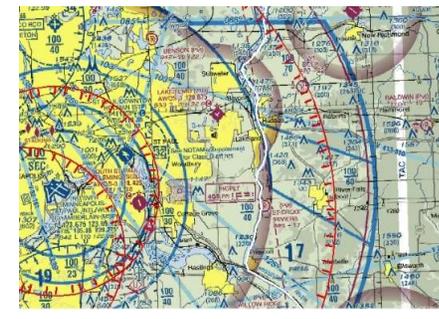*Use Apps such as UAVForecast, B4UFLY, UASidekick, Foreflight, Aloft Aircontrol & others for planning and insight*

Drone Aerial Photography & Videography
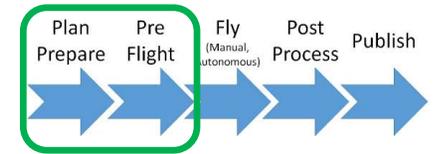## Flying Smart, Flying Safe – Plan & Prepare

- Will you be flying from a new location and/or, in new or controlled airspace?
- Do you have airspace authorizations, any TFRs or DROTAMS?
- What are the obstacles (people, trees, buildings, towers)?
- How far and high will you fly? How long at destination?
- What are your emergency and contingency procedures?
- Battery needed (round trip transit, on-location, reserve)?
- Flying manual or autonomous (is your mission tested)?
- If night, will you have chance to fly location during daylight for familiarization?

Use Apps such as UAVForecast, B4UFLY, UASidekick, Foreflight, Aloft Aircontrol & others for planning and insight
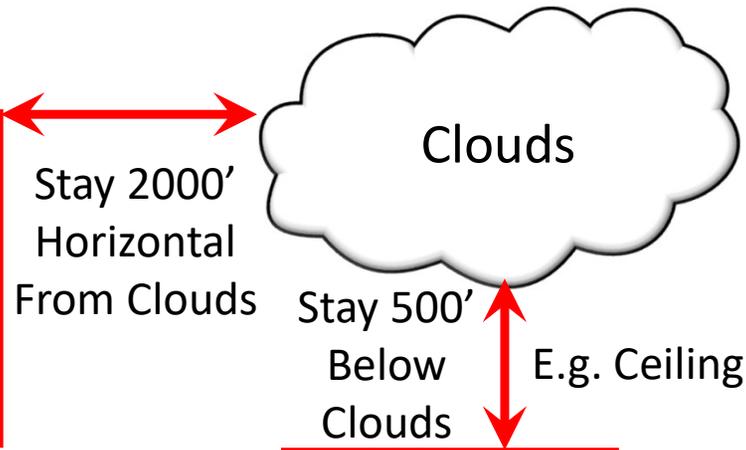
Drone Aerial Photography & Videography
General Reminders – Drone Rules and Regulations

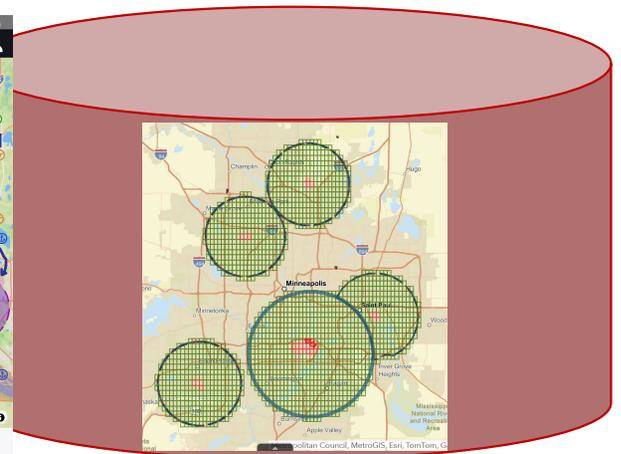Plan Prepare → Pre Flight → Fly (Manual, Autonomous) → Post Process → Publish
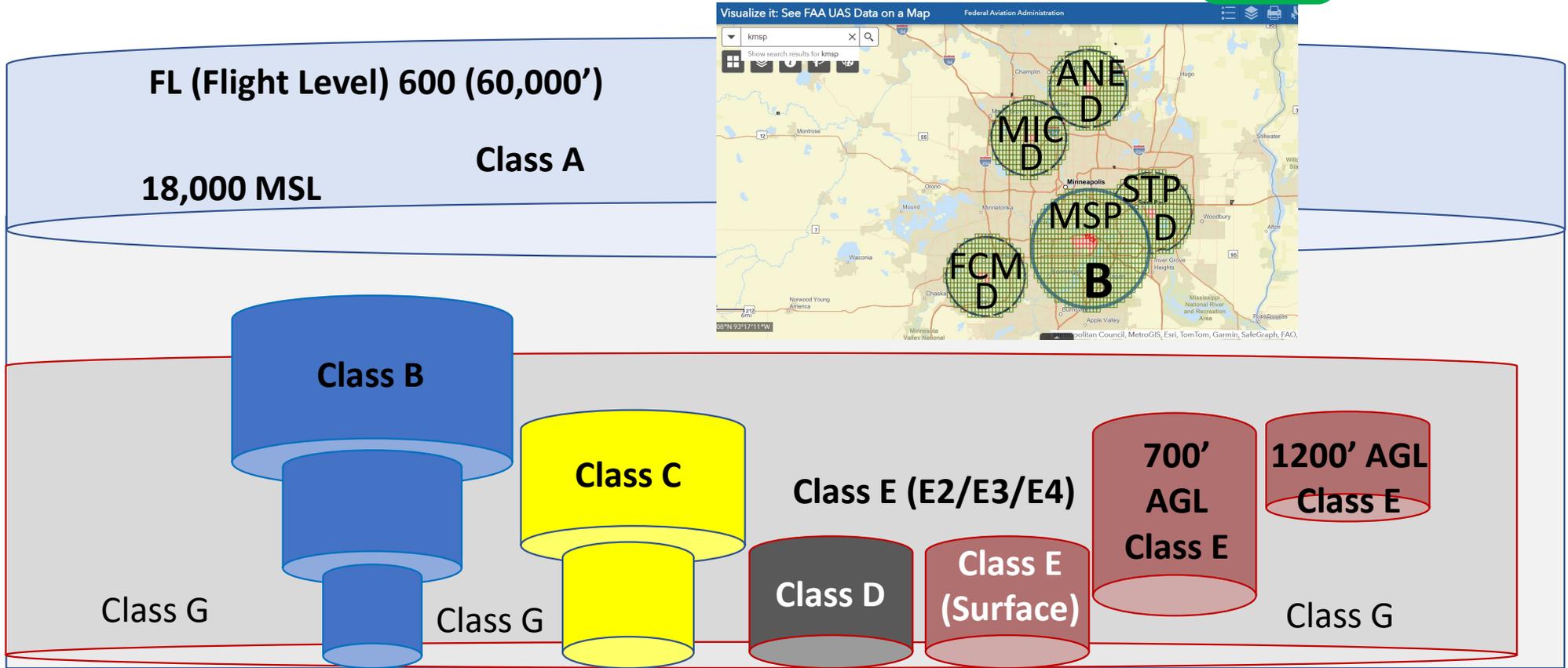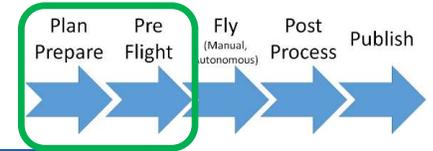
- ❑ **What Airspace Will You Be Flying In?**
- ❑ **Controlled, Uncontrolled, Both?**
- ❑ **Airspace Authorization (LAANC) needed?**
- ❑ **Do you have or need any waivers?**
- ❑ **Any TFRs/MOAs or restricted areas?**
- ❑ **Any Ground Restrictions (e.g. Parks etc.)?**

Clouds

Stay 2000' Horizontal From Clouds

3 statue mile visibility

OOP/OOMV

Stay 500' Below Clouds

E.g. Ceiling

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

(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 Aerial Photography & Videography

Flying Smart, Flying Safe – Planning - Airspace Considerations?

FL (Flight Level) 600 (60,000')

Class A

18,000 MSL

Class B

Class C

Class E (E2/E3/E4)

700' AGL Class E

1200' AGL Class E

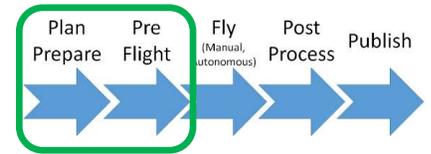**Class D**

Class E (Surface)

Class G

Class G

Class G

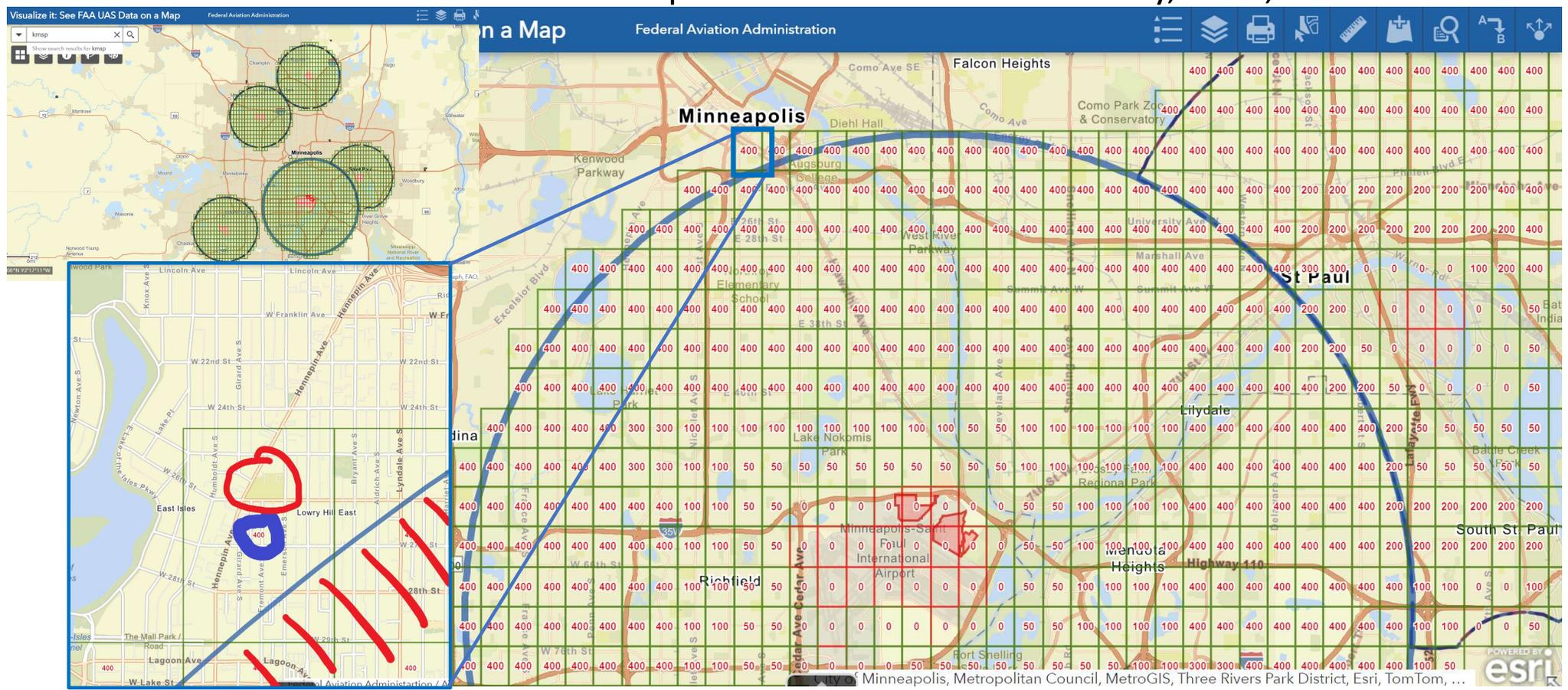https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/media/17_phak_ch15.pdf

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

Drone Aerial Photography & Videography

Flying Smart, Flying Safe – Planning - Airspace Considerations?

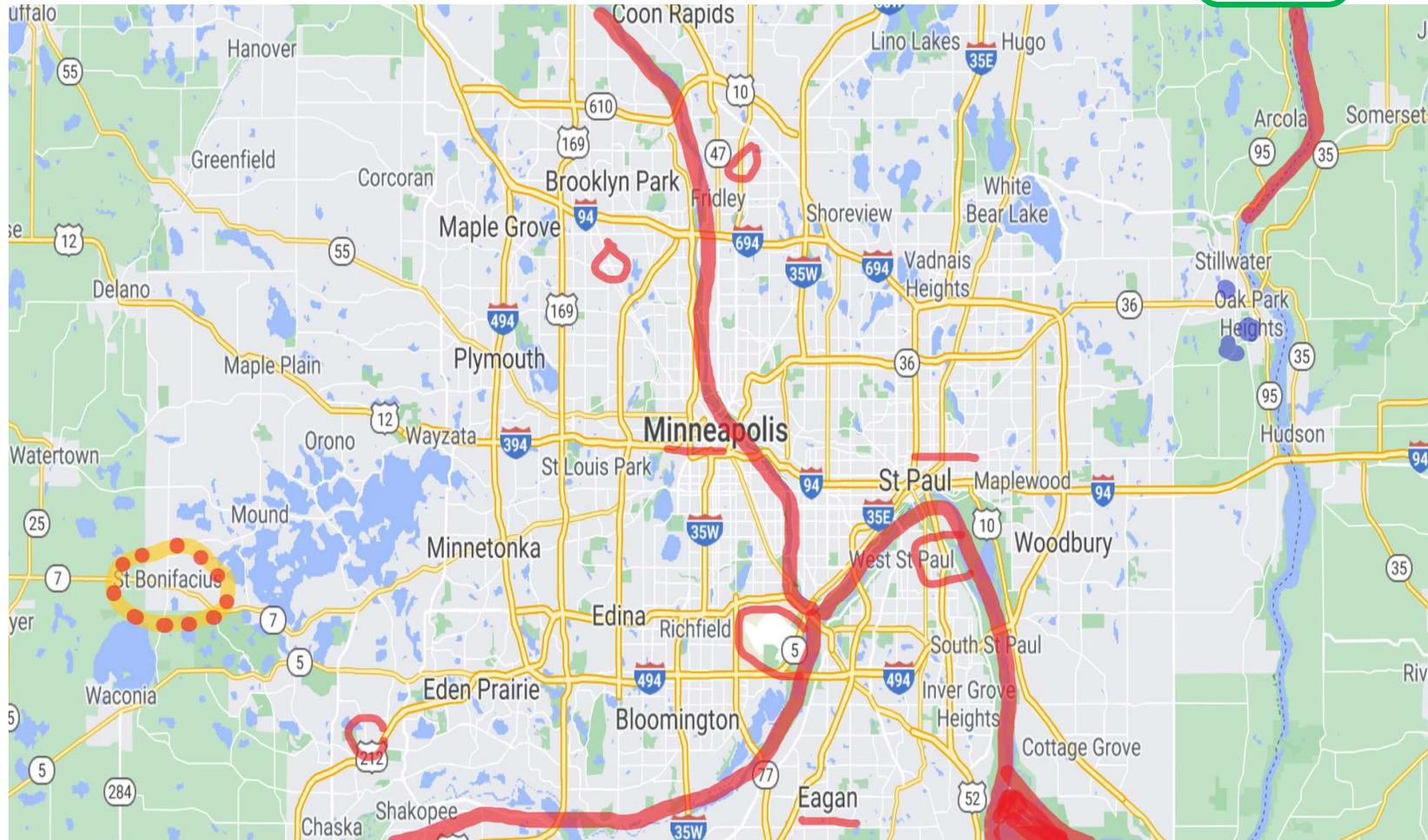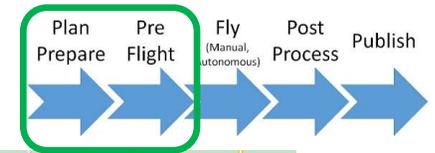Plan Prepare | Pre Flight | Fly (Manual, Autonomous) | Post Process | Publish

Via FAA Visualize It – To Get LAANC Airspace Authorization Use B4UFly, Aloft, & Others

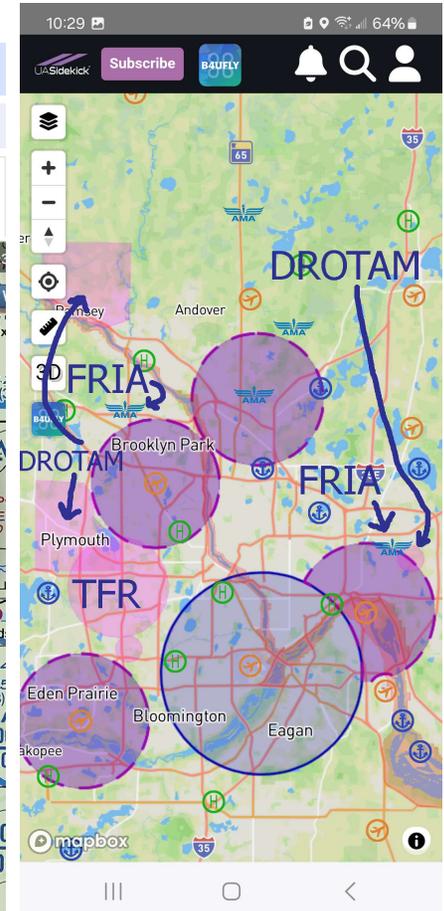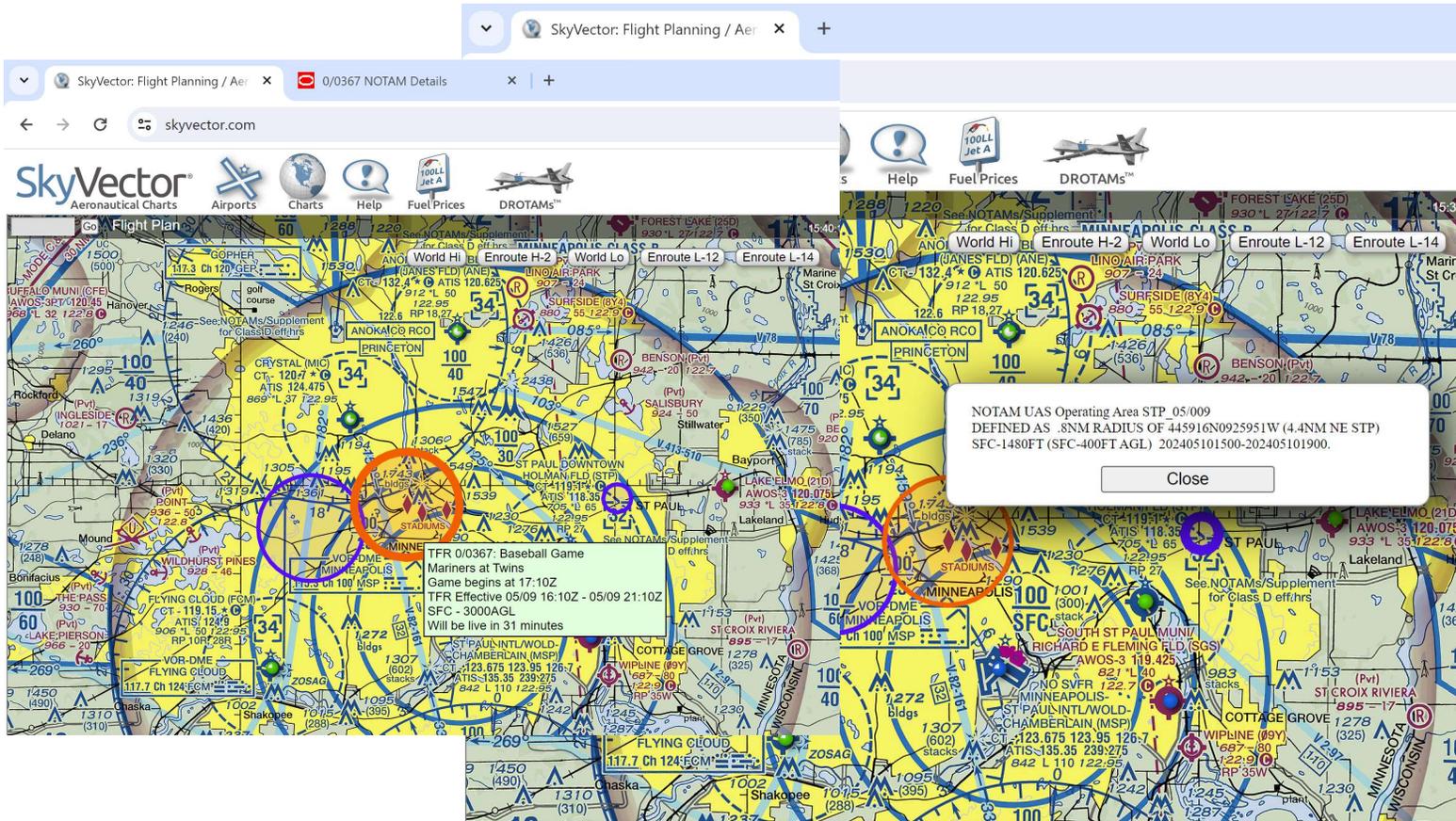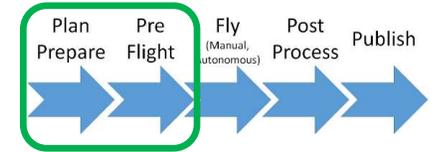# Drone Aerial Photography & Videography
Flying Smart, Flying Safe – Planning - Ground Considerations?
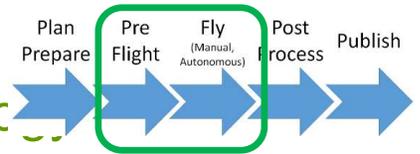
Drone Aerial Photography & Videography
Flying Smart, Flying Safe – Airspace, TFRs & NOTAMS

Via Skyvector and UASidekick

Drone Aerial Photography & Videography
Flying Smart, Flying Safe – Sampling of Some Tools and Technology

Flight Planning and Awareness Apps

- *UAVforecast (weather, airspace & TFR maps), Aloft Aircontrol (airspace & TFR Maps, LAANC authorizations), MyRadar (Weather), UASidekick (airspace & TFR Maps, LAANC), Foreflight (airspace & TFR Maps), vfrmap.com (airspace), skyvector (airspace & TFR), FAA Visualize It (Google it, airspace maps),*
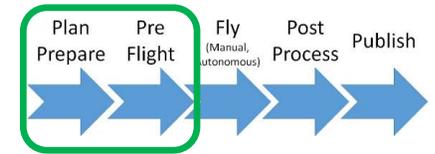
Mission Planning and Flight Apps

- *Autel Explorer, DJI Fly (Go & Go4 older DJI), DJI Pilot, DroneDeploy, Drone Harmony, Dronelink, Litchi & Pilot, Map Pilot, Pix4D Capture, Potensic, UgCS among others*
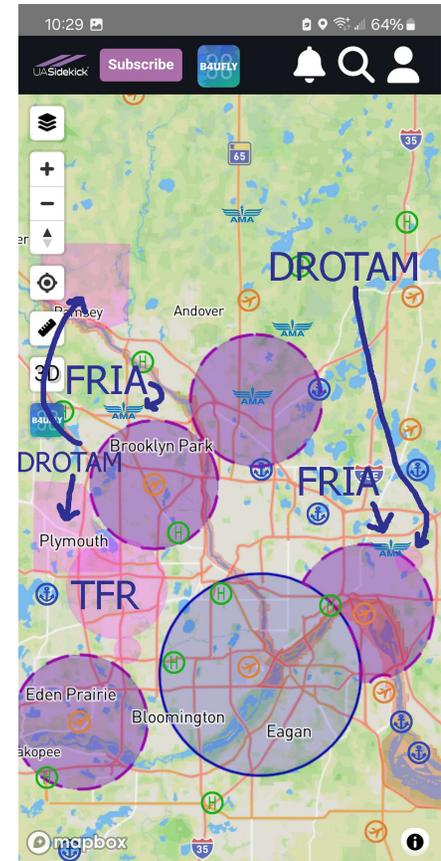
Miscellaneous

- *DJI Virtual Flight Simulator, RID scanner (Dronetag, OpenDrone ID, Drone Scanner)*
- *Firehouse Strobe Lights, Hard Cases, Spare Batteries, Lanyard/should straps*
- *Neutral Density (ND) Filters, UV Filters lens covers*

Drone Aerial Photography & Videography

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 Aircontrol & others for planning and insight

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 & faasafety.gov
- 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/b4ufly
- DJI Virtual Flight Simulator (Free) - dji.com/downloads/djiapp/dji-virtual-flight
- MnDoT Aviation (Commercial Drone License & Registration dot.state.mn.us/aero/drones
- Facebook: The Mighty Drones – FPV Drone Racing facebook.com/groups/themightydrones
- Facebook: MN sUAS facebook.com/groups/1860070477555048
- Pictures Over Stillwater https://PicturesOverStillwater.com/links facebook.com/PicturesOverStillwater 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)
- ✓ 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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FAA Part 107 & MnDoT Aeronautics Licensed Commercial Drone Operator
Professional Photographer, Videographer and FPV - MN FAASTeam Rep DronePro

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vimeo.com/picturesoverstillwater | twitter.com/POStillwater | Instagram.com/PicturesOverStillwater
picturesoverstillwater.smugmug | youtube.com/@picturesoverstillwater