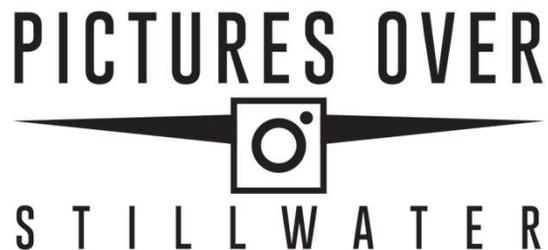


# Drone Part 2 – Aerial Photography and Video Community Ed Summer/Fall 2025



By Greg Schulz – Pictures Over Stillwater

FAA Part 107 & MnDoT Aeronautics Licensed Commercial Drone Operator  
Professional Photographer, Videographer and FPV - MN FAAS Team Rep DronePro

[PicturesOverStillwater.com/links](https://PicturesOverStillwater.com/links) | [facebook.com/PicturesOverStillwater](https://facebook.com/PicturesOverStillwater)  
[vimeo.com/picturesoverstillwater](https://vimeo.com/picturesoverstillwater) | [twitter.com/POStillwater](https://twitter.com/POStillwater) | [Instagram.com/PicturesOverStillwater](https://Instagram.com/PicturesOverStillwater)  
[picturesoverstillwater.smugmug.com](https://picturesoverstillwater.smugmug.com) | [youtube.com/@picturesoverstillwater](https://youtube.com/@picturesoverstillwater)

# Drone Aerial Photography & Videography

## Flying Smart, Flying Safe – Introduction

- Greg Schulz – [greg@picturesoverstillwater.com](mailto: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)



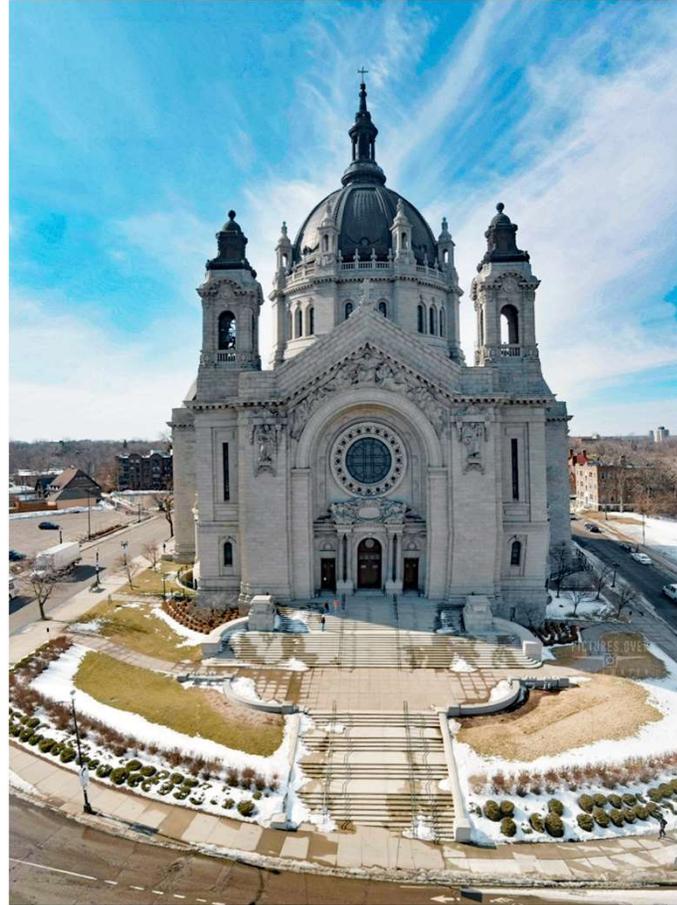
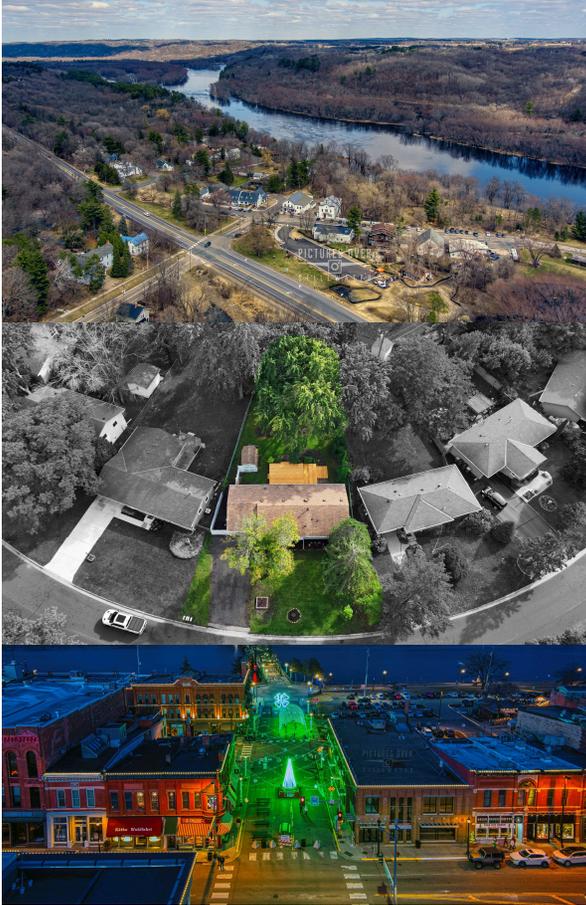
# Drone Aerial Photography & Videography

## Flying Fun, Flying Smart, Flying Safe – Some Aerial Photography



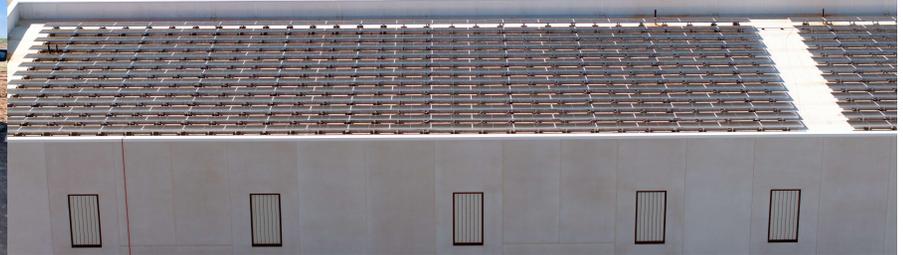
# Drone Aerial Photography & Videography

## Flying Fun, Flying Smart, Flying Safe – Some Aerial Photography



# Drone Aerial Photography & Videography

## Flying Fun, Flying Smart, Flying Safe – Some Aerial Photography



# Drone Aerial Photography & Videography

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 Aerial Photography & Videography

## Flying Smart, Flying Safe – Big Picture and Background

<https://www.faasafety.gov/>

faasafety.gov/FAASTApp/directory/default.aspx

Select at least one of the following positions in your report

NFM  
  Nat'l Admin  
  RPOC  
  FPM  
 Lead Rep  
 Rep  
 Service Provider  
 Industry Member  
 Unassigned

Click to Hide Map

Click a State to view find FAASafety leaders by state.

# Drone Aerial Photography & Videography

## 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

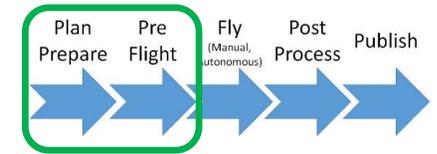
**Where to Fly**  
Airspace - UAS Regs, TFRs - FAA  
Ground – Private, City, Cty, State, Fed

### What & Where Is Your Subject

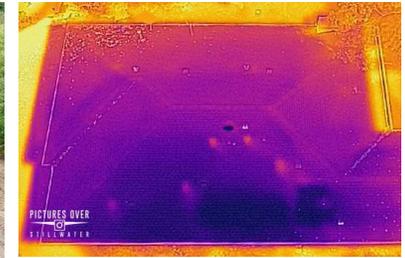
**Weather Conditions**  
Day, Night, Wind  
Clouds, Visibility

# Drone Aerial Photography & Videography

## Flying Smart, Flying Safe – The View is Different Up There



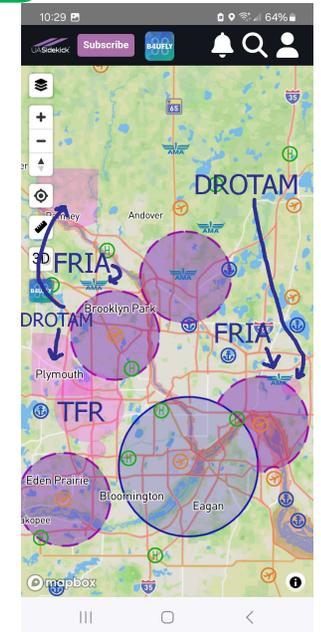
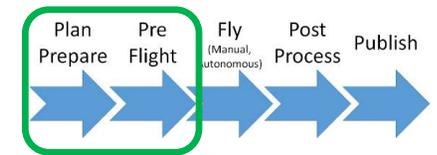
- Whats different from being up in the air?
  - Aspect ratios, perspectives and elevations
  - Seeing things from different view vantage points
  - Clouds, sky, water glare, shadows and reflections
  - Birds, aircraft and other drones in the area
  - Airspace and ground location restrictions
  - Staying 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

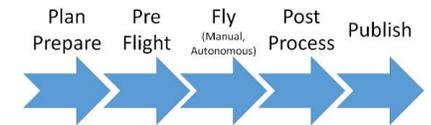
## General Reminders – Drone Rules and Regulations

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 – 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.

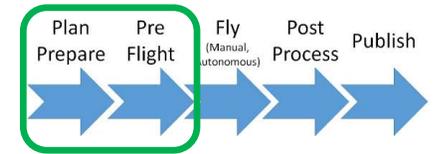
**Post-Flight:** Safe and stow equipment, let batteries cool before storing and charging, repair equipment, make any notes about repairs or incidents encountered during flight to follow up, offload images from MicroSD card or aircraft to other device. Rename folders and files as needed as part of workflow. 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

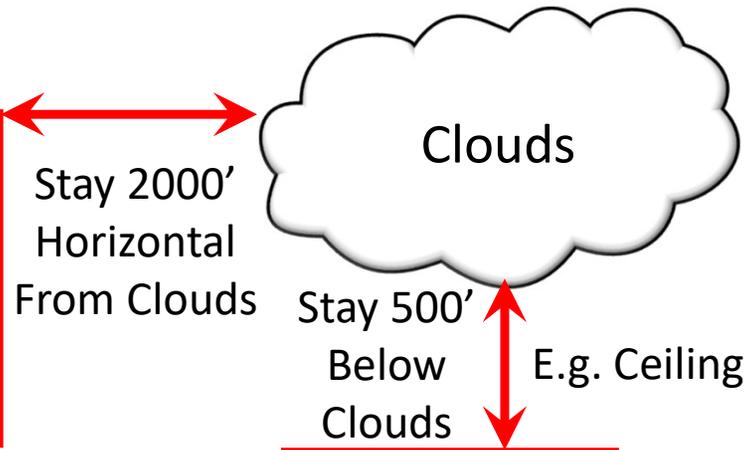
## General Reminders – Drone Rules and Regulations



3 statute mile  
visibility

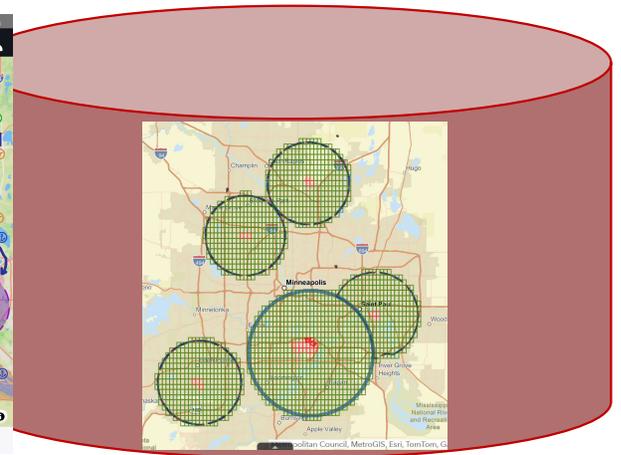


OOP/OOMV



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

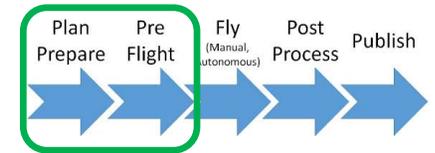
- What Airspace Will You Be Flying In?
- Controlled, Uncontrolled, Both?
- Airspace Authorization (LAANC) needed?
- Do you have or need any waivers?
- Any TFRs/MOAs or restricted areas?
- Any Ground Restrictions (e.g. Parks etc.)?



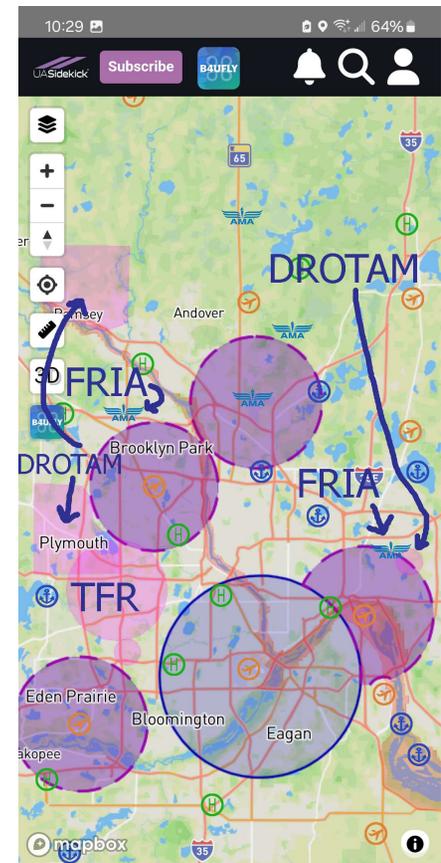
- (1) Hobby/Rec limited to 400' AGL in uncontrolled, All Alt in Controlled are absolute unless waiver or special authorization
- (2) OOP / OOMV requires waiver and/or special category of aircraft and avoid flying low and reckless

# Drone Aerial Photography & Videography

## General Reminders – Safety Tips For Before and During Flights



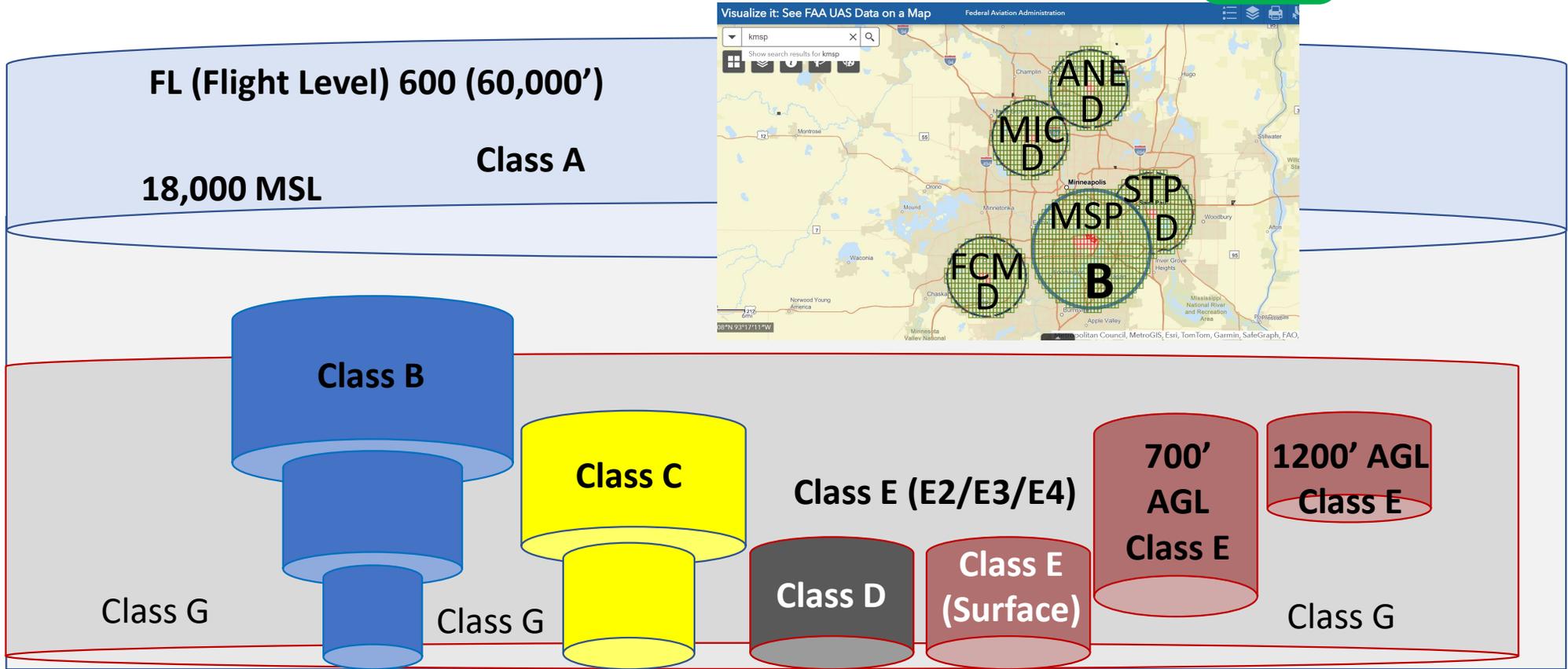
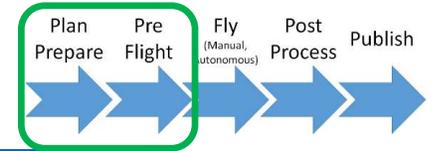
1. Follow FAA Part 107 or Hobby/Rec CBO / TRUST rules
2. Plan ahead and be prepared, use checklists:
  - Weather conditions (wind, temp, ceiling, visibility)
  - Location (Airspace, Ground Permissions, Obstacles)
  - Do you need and have Airspace Authorizations
  - Are there any TFRs or other airspace 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 Aerial Photography & Videography

Flying Smart, Flying Safe – Planning - Airspace Considerations?

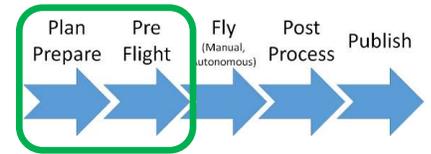


[https://www.faa.gov/regulations\\_policies/handbooks\\_manuals/aviation/phak/media/17\\_phak\\_ch15.pdf](https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/media/17_phak_ch15.pdf)

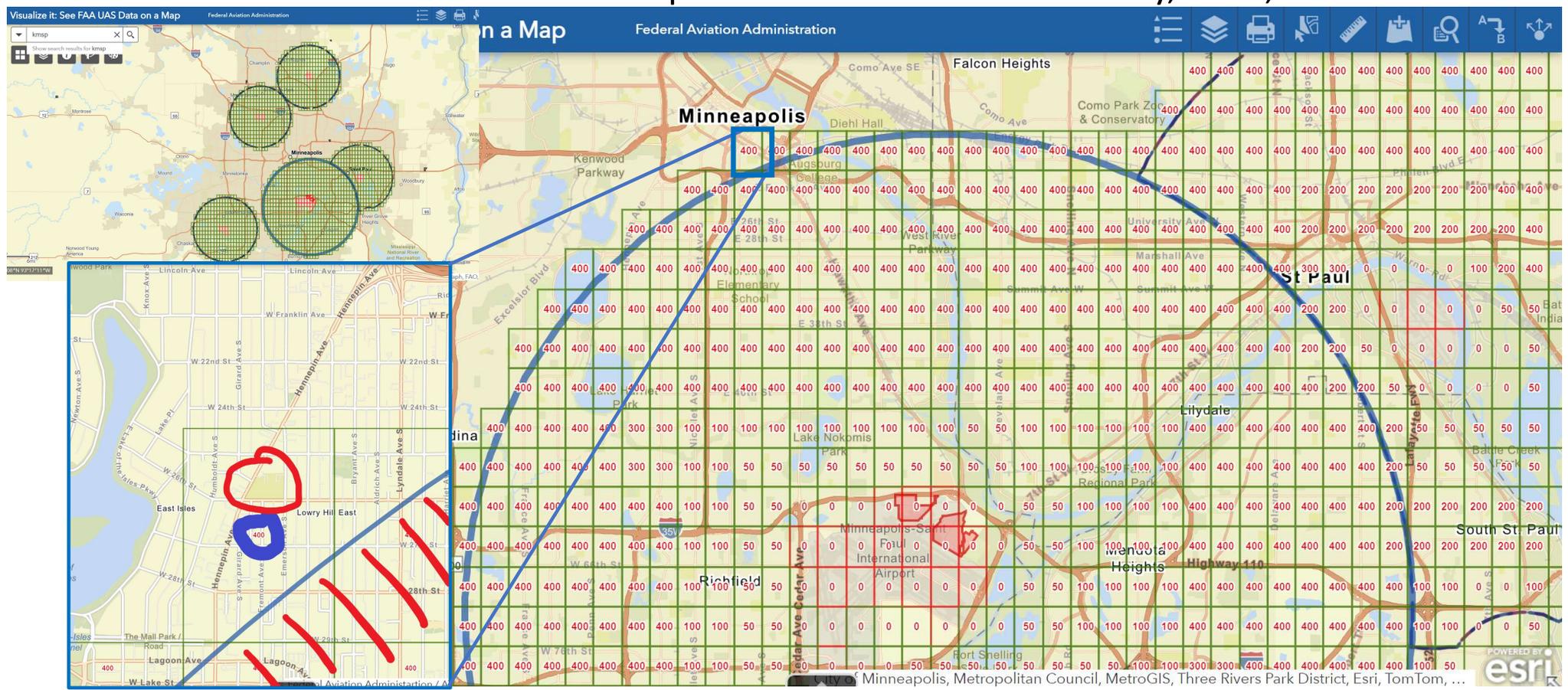
Use Apps such as UAVForecast, B4UFLY, UASidekick, Foreflight, Aloft Aircontrol & others for planning and insight

# Drone Aerial Photography & Videography

## Flying Smart, Flying Safe – Planning - Airspace Considerations?

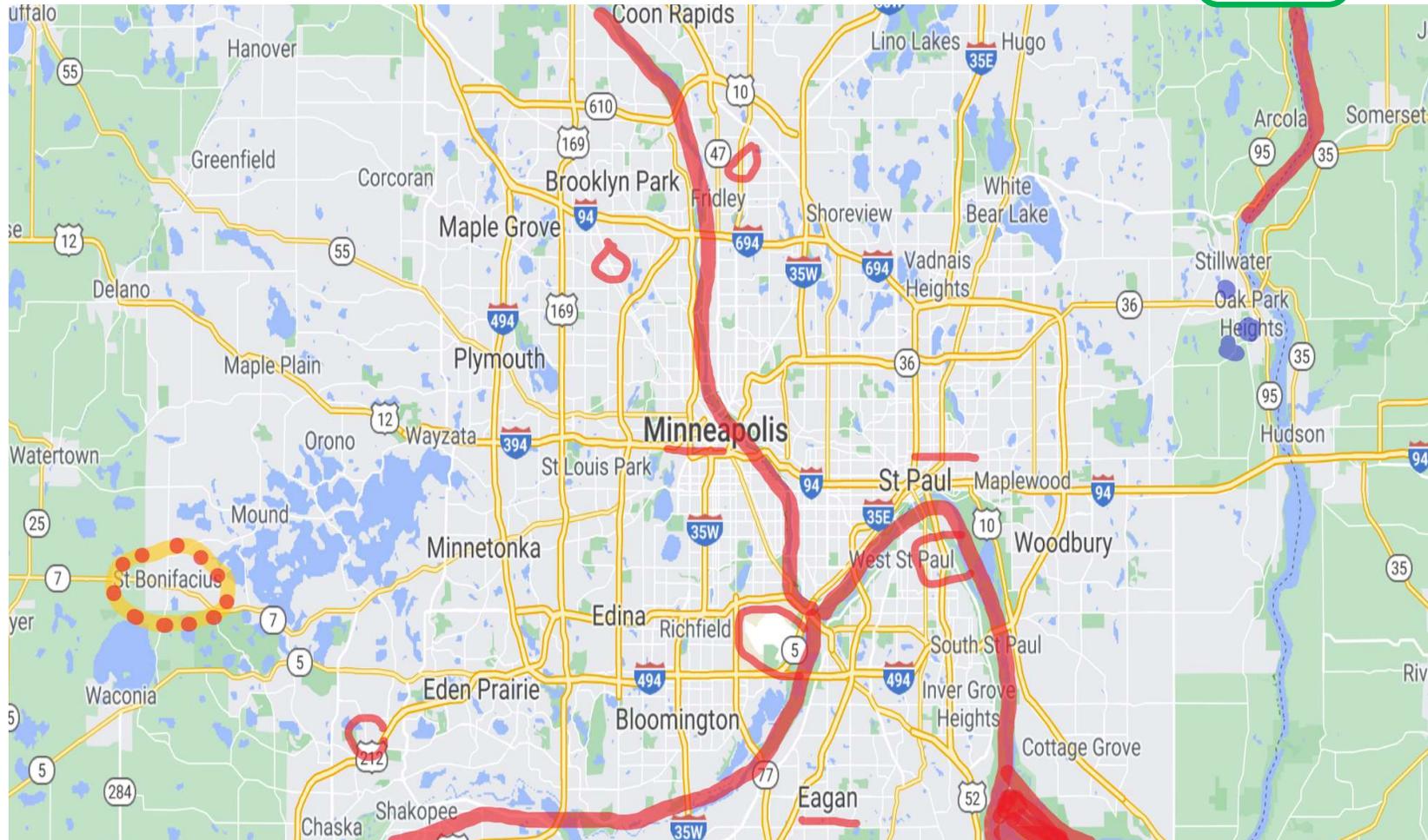
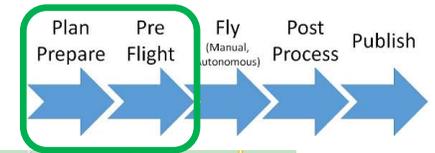


Via FAA Visualize It – To Get LAANC Airspace Authorization Use B4UFLy, Aloft, & Others



# Drone Aerial Photography & Videography

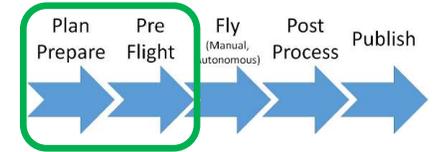
## Flying Smart, Flying Safe – Planning - Ground Considerations?



# Drone Aerial Photography & Videography

## Flying Smart, Flying Safe – Airspace, TFRs & NOTAMS

Via [notams.aim.faa.gov/notamSearch/nsapp.html#/](https://notams.aim.faa.gov/notamSearch/nsapp.html#/)



Also see [tfr.faa.gov/tfr2/list.html](https://tfr.faa.gov/tfr2/list.html)

Searched at: 2024-05-09 15:24:48 UTC

Location search on location(s) STP. 16 NOTAM(s) found.

Location	Number	Class	Start Date UTC	End Date UTC	Condition
STP	04/012	Obstruction	04/25/2024 1200	04/24/2026 2200	OBST CRANE (ASN 2023-AGL-12598-OE) 445719N0930522W (1.8NM NW STP) 899FT (130FT AGL) FLAGGED AND LGTD 2401231920-2405152300
STP	3/8113	Procedure	12/20/2023 1634	12/20/2025 1634EST	SID STP 13: STP
STP	4/7458	Procedure	04/05/2024 1921	09/30/2024 1921EST	ODP SFC-400FT
STP	04/006	Obstruction	04/11/2024 0111	08/09/2024 0111	STP OF U/S 2405101500-2405101900
STP	03/001	Obstruction	03/05/2024 0600	07/03/2024 0600	STP OF U/S 2405101500-2405101900
STP	05/002	Services	05/01/2024 1238	05/30/2024 2000EST	RWY 3: RWY 1-1
STP	05/003	Services	05/01/2024 1239	05/30/2024 2000EST	RWY 1-1
STP	03/034	Obstruction	03/26/2024 0240	05/26/2024 2359	OBST 1 240326
STP	01/072	Obstruction	01/23/2024 1920	05/15/2024 2300	OBST CRANE (ASN 2023-AGL-12598-OE) 445719N0930522W (1.8NM NW STP) 899FT (130FT AGL) FLAGGED AND LGTD 2401231920-2405152300
STP	05/004	Communications	05/12/2024 0400	05/12/2024 1000	COM REMOTE TRANS/REC 121.675 U/S 2405120400-2405121000
STP	05/009	Airspace	05/10/2024 1500	05/10/2024 1900	AIRSPACE UAS WI AN AREA DEFINED AS .8NM RADIUS OF 445916N0925951W (4.4NM NE STP) SFC-400FT AGL 2405101500-2405101900
STP	05/008	Services	05/09/2024 1500	05/09/2024 1800	AD AP RVR ALL U/S 2405091500-2405091800
STP	LTA-M98-17	LTA	02/01/2023 0900	02/01/2025 0859	VFR Practice Instrument Approaches

Searched at: 2024-05-09 15:23:02 UTC

Location search on location(s) STP. 15 NOTAM(s) filtered.

Filters 15

Location	Number	Class	Start Date UTC	End Date UTC	Condition
STP	05/009	Airspace	05/10/2024 1500	05/10/2024 1900	AIRSPACE UAS WI AN AREA DEFINED AS .8NM RADIUS OF 445916N0925951W (4.4NM NE STP) SFC-400FT AGL 2405101500-2405101900

End of Report

U.S. Department of Transportation  
Federal Aviation Administration  
800 Independence Avenue, SW  
Washington, DC 20591  
(866) TELL-FAA | (866) 835-5322

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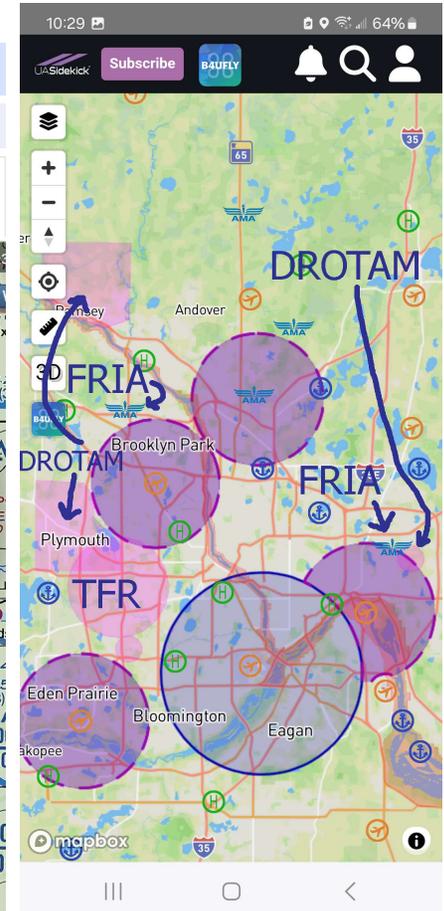
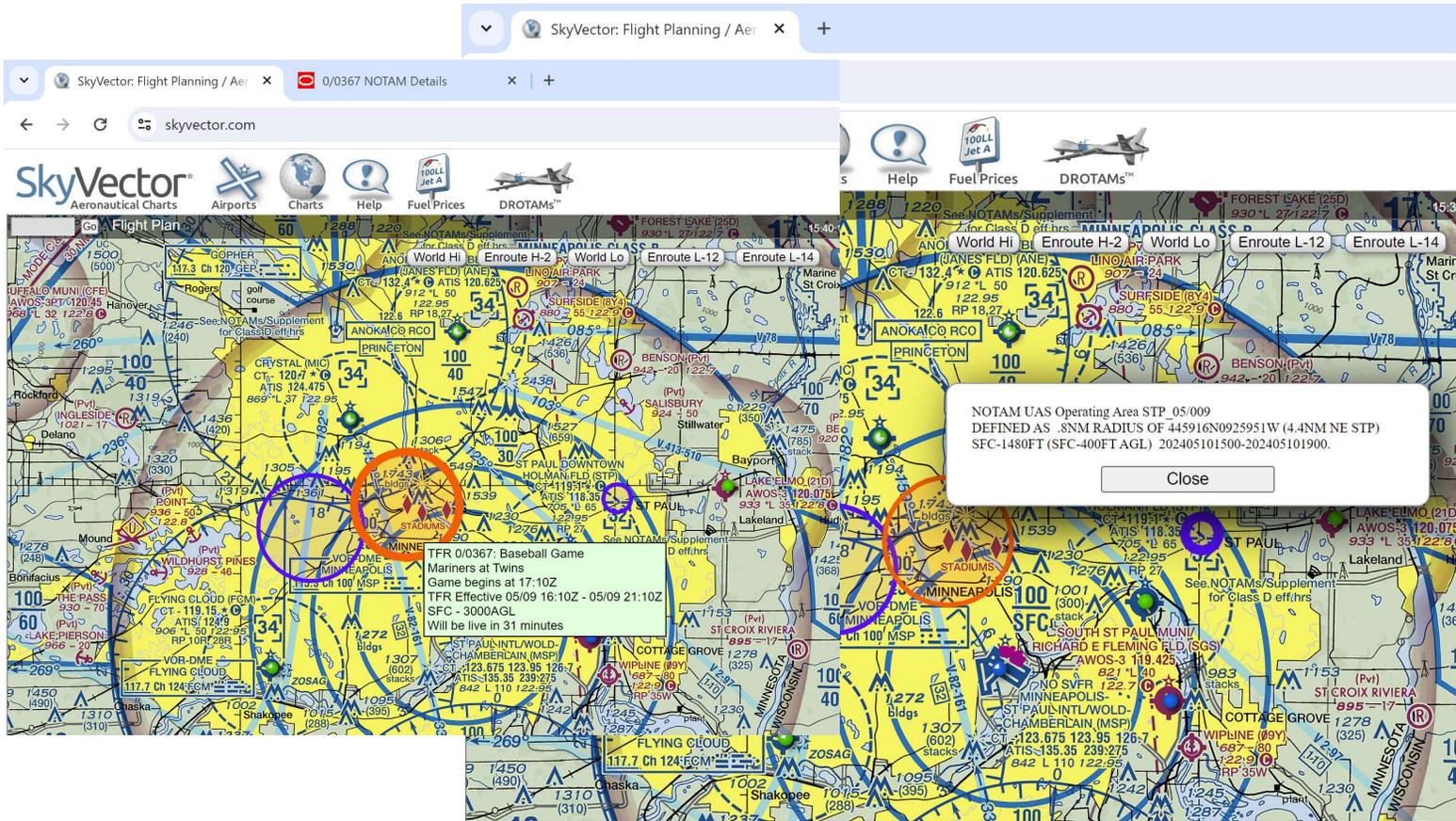
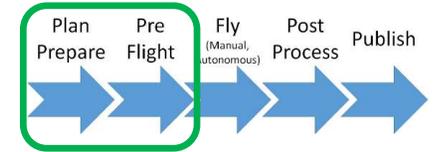
Government Sites  
Transportation.gov  
USA.gov  
Plainlanguage.gov  
Regulations.gov  
Data.gov

Contact Us  
Customer Support: 1-866-466-1336  
Email: 7-AWA-NAIMES@faa.gov

# Drone Aerial Photography & Videography

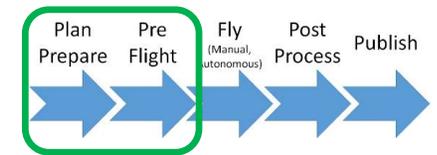
## Flying Smart, Flying Safe – Airspace, TFRs & NOTAMS

Via Skyvector and UASidekick



# Drone Aerial Photography & Videography

## Flying Smart, Flying Safe – What Are You Capturing?



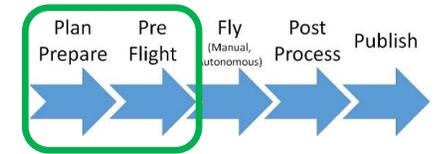
- Understanding your mission or objectives helps determine:
  - Are you looking for action (fast) or cinematic look (smooth)?
  - Are you flying manually or via autonomous modes?
  - What settings to use (e.g. WB, ISO, FPS, Resolution, style, EV, log)
  - Fixed or stationary subject and move slow = lower FPS & sharper footage
  - Are you shooting normal oblique, panorama, orthophoto or other?
  - Capturing moving subject, or you are moving fast = higher FPS
  - Shooting photos from the cardinals (North, NE, East, SE, South, SW, West, NW)
  - What type of moves are you going to use?
    - Push in / out (zoom, dolly zoom/vertigo)
    - Pan left/right, gimbal/pan up/down
    - Pedestal (Raise/lower aircraft) altitude
    - Orbit subject (inward or outward)
    - Compound shots using combination of above
    - Free flying, twisting, turning, ripping, zipping, flipping



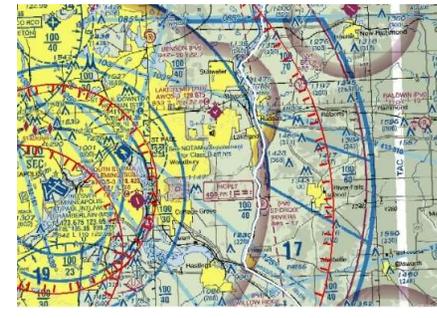
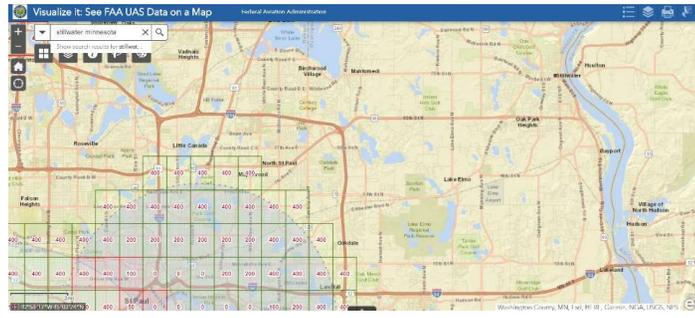
- Tips for Smooth Capture**
- ✓ Use “Cine” Mode Controls
  - ✓ Adjust Controller Sticks ESC
  - ✓ Fly slow and smooth
  - ✓ Leverage tracking modes
  - ✓ Pay attention to wind

# Drone Aerial Photography & Videography

## Flying Smart, Flying Safe – Plan & Prepare



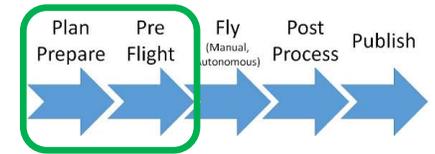
- Will you be flying from a new location and/or, in new or controlled airspace?
- Do you have airspace authorizations, any TFRs or DROTAMS?
- What are the obstacles (people, trees, buildings, towers)?
- How far and high will you fly? How long at destination?
- What are your emergency and contingency 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

## Flying Smart, Flying Safe – Data Storage - Storing Your Images



- Device Storage (Camera and Sensor) e.g. SD/MicroSD among others

- Look beyond just capacity and cost  
(Speed of SD/MicroSD cards, USB-B vs. USB-C)  
Lossless vs. Lossy compression, space savings

- Post processing? Local or via cloud?
- Local storage (SSD or HDD, USB, NVMe, SATA, NAS)
- Cloud storage? How will you get TBs to cloud?
- Where backup, protect, archive your data to?

- Where will you store your finished photos and videos? What format?

- YouTube, Vimeo, Facebook, Instagram, Website, MLS or elsewhere?

SD/Micro SD = Form factor

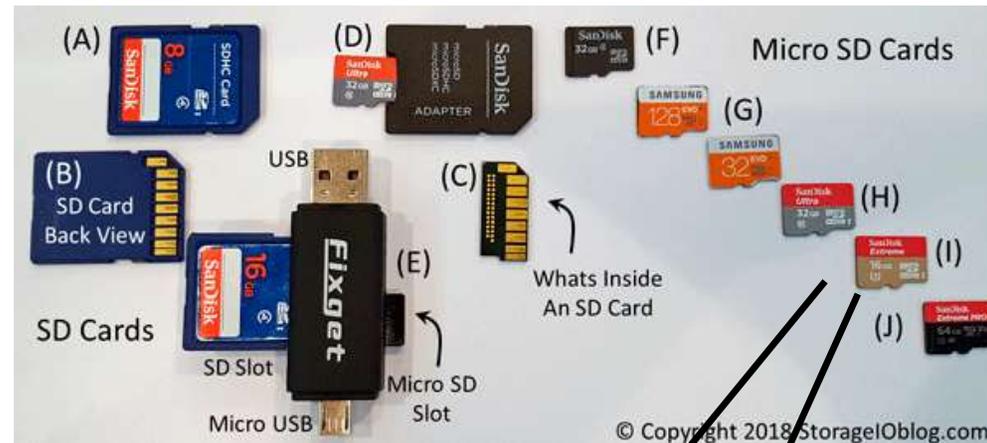
A2 = Application Speed = 4K R, 2K W lops – 10MB/s

SD = <=2G, SDHC = <=32G SDXC = <=2TB

Class 10 = 10MB/s writes

U3 = UHS 30MB/s

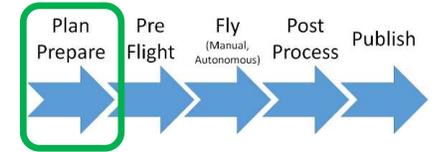
U1 = UHS 10MB/s



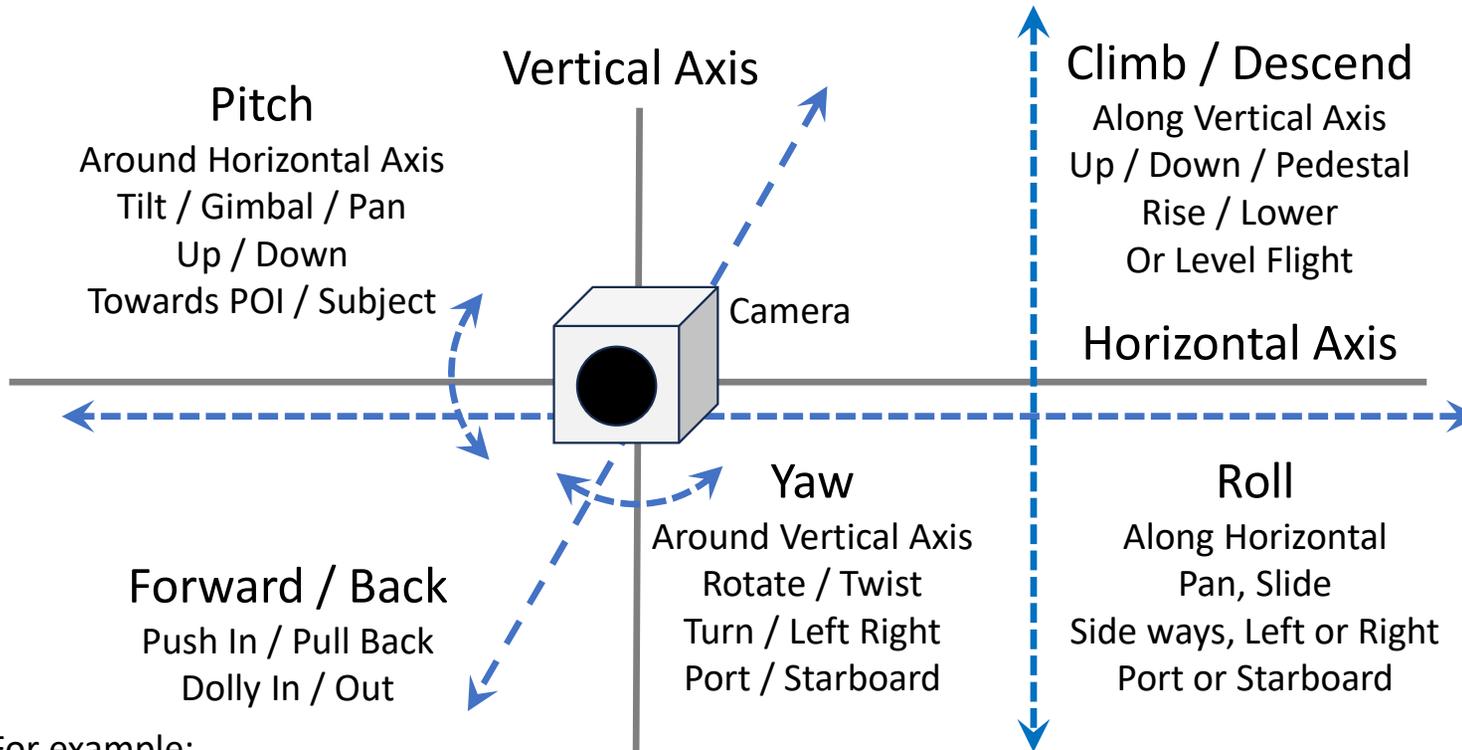
V <sub>90</sub>	90MB/s	8K
V <sub>60</sub>	60MB/s	4K
V <sub>30</sub>	30MB/s	4K
V <sub>10</sub>	10MB/s	HD
V <sub>6</sub>	6MB/s	SD

# Drone Aerial Photography & Videography

## Flying Smart, Flying Safe – Aircraft & Camera/Gimbal Movement



Subject = POI (Point of Interest)



**Climb / Descend**  
Along Vertical Axis  
Up / Down / Pedestal  
Rise / Lower  
Or Level Flight

Aircraft & Gimbal Attitude

Inwards Towards POI  
Outwards From POI  
Camera = Gimbal  
Combine Moves  
Adjusting Gimbal  
Orbit = Yaw & Roll  
Direction of Flight  
Gimbal Angle (- or +)  
Aircraft Direction  
Aircraft Speed  
Level, Climb/Descend  
Distance Travel

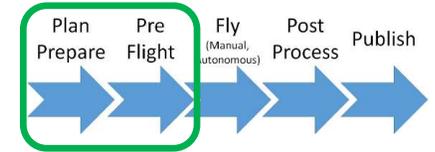
For example:

Aircraft pointed North, Direction of Flight East (flying sideways/Roll), Gimble down -45, Level Flight, distance 500' AGL

Aircraft pointed North focused on POI, Flying East, Gimble centered on POI, climb from 100' AGL to 250' AGL distance 500'

# Drone Aerial Photography & Videography

## Flying Smart, Flying Safe – Camera Settings, Exposure Triangle



Also consider White Balance (WB)

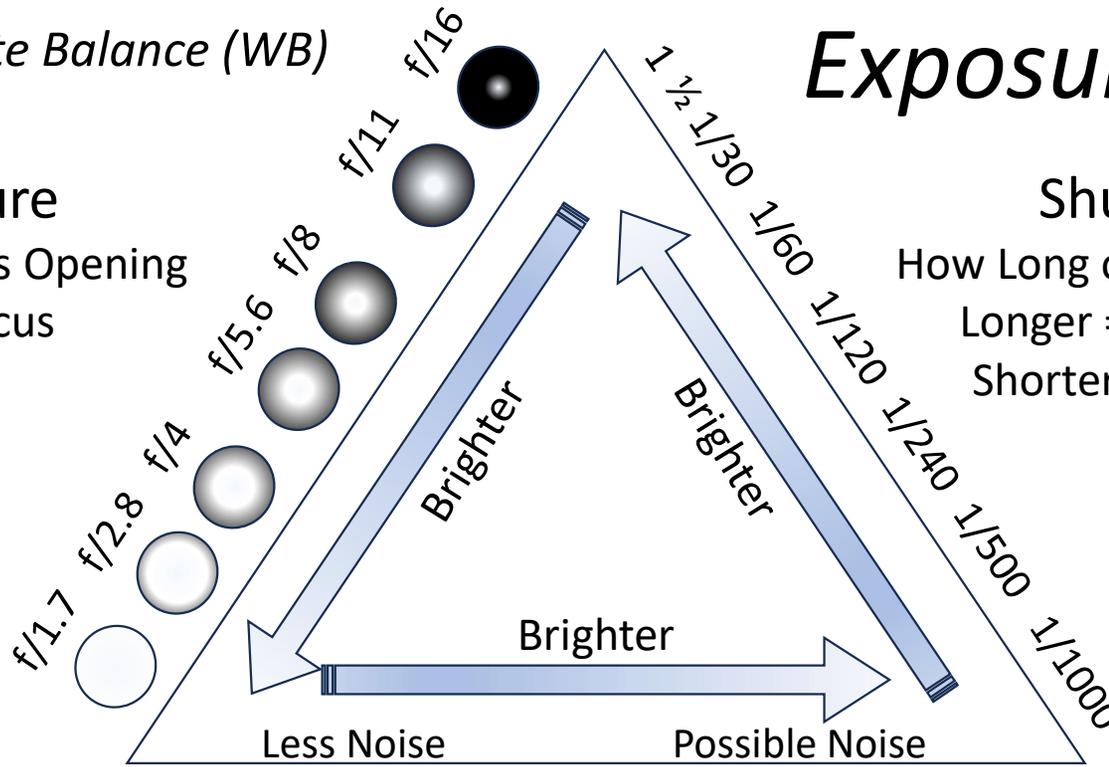
# Exposure Triangle

### Aperture

f/stop, Iris, Lens Opening  
Background Focus  
Depth of Field  
And Light

### Shutter Speed

How Long of Exposure In Seconds  
Longer = More Light & Motion  
Shorter = Less Light & Motion



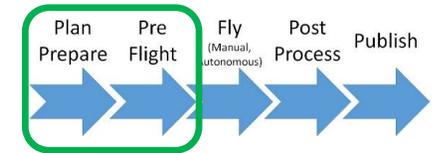
100 200 400 800 1600 3200 6400

ISO (Sensitivity To Light)



# Drone Aerial Photography & Videography

## Flying Smart, Flying Safe – Camera Settings



Besides exposure (ISO, Aperture, Shutter, EV):

- Focus (AF, AFC, Infinity, Manual)
- White Balance (WB) Auto (AWB) or Manual
- Contrast, Sharpness, Saturation, Noise Red. Style settings
- Raw, JPG, Raw+JPG, Camera Raw (not common on lower end)
- Frame size (1:1, 3:2, 4:3, 16:9, etc.)
- Camera selection (if available) and ND Filters
- Enable grid views, peaking, histogram on display tools
- Special modes:
  - “Night” mode, toggle between RGB & Thermal (if available)
  - Single shot, burst, timelapse/hyperlapse, AEB/Bracketed
  - Panoramas (wide, tall, 360, in camera stitch or manual)
  - Some drones have a virtual tri-pod/dual stability mode
  - Tracking, Point of Interest (POI), Spotlight, Orbit

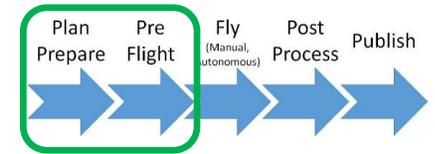
Note: Some cameras & drones have global settings, others are per camera, some are common for photo and video.



Note: Keep Camera Sensor size in perspective e.g. ½”, 1”, 1/1.3”, 4/3. Also keep FOV and lens equivalent in mind.

# Drone Aerial Photography & Videography

Flying Smart, Flying Safe –Settings, Frame Size, Resolution



## For Still Cameras

MP (Megapixels)  
4, 8, 16, 20, 40, 48

## For Still & Video

RAW/DNG/Flat vs JPG  
Cine/True Color/Log  
Exposure Settings  
ISO (Lower vs Higher)  
Frame Rate/FPS  
White Balance  
Sharpness, Contrast  
Saturation, Noise



Aspect Ratios

# Drone Aerial Photography & Videography

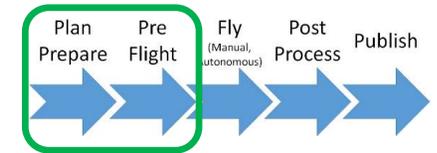
## Flying Smart, Flying Safe – Camera Settings

Besides exposure (ISO, Aperture, Shutter, EV):

- Video encoding (MP4, MOV, Prores, HEVC/H.265, H.264)
- Resolution 1K, 2.7K, 4K, 6K, 8K, 10K
- Eight bit or Ten bit HDR
- Frame Rate (24/24/29.9/30/48/50/59.9/60/120 fps)
- Video mode Normal, Log, Dlog, Hlog among others
- Display option to show natural vs. flat on screen for log
- Missions using waypoint for repetitive autonomous flights
- Many other options vary by make, model, price

Reminder: Higher resolution and frame rates need faster MicroSD cards (e.g. U3/V3 or faster) not just more capacity.

Note: Some Drones have LUTs or color mgmt. plugins for color correction.

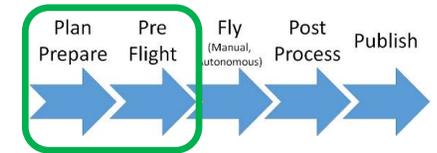


Parallax Compressed Background



# Drone Aerial Photography & Videography

## Flying Smart, Flying Safe – Various Types of Panoramas

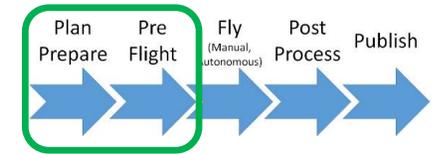


- Panoramas: Vertical, Horizontal, Wide, 180, 360 spherical
  - Vertical (tall subjects), Horizontal (wide subjects), very wide, 360 spherical
  - Various projections (fisheye, flat horizon, wrap around, tiny planet)
  - Also to create ultra high resolution large images beyond camera specs.
  - Manual or automated capture, manual or automated processing
  - Manual capture shoot with 1/3 overlap of images (over shoot if needed)
  - Use various tools for stitching/compositing of manual captured images



# Drone Aerial Photography & Videography

## Flying Smart, Flying Safe – Various Types of Panoramas

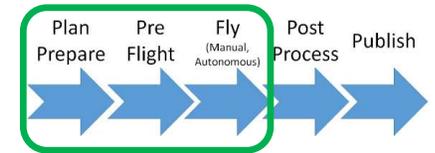


- Special Panoramas for large, high resolution images
  - Where viewer will be very close to the image when its enlarged to avoid pixilation



# Drone Aerial Photography & Videography

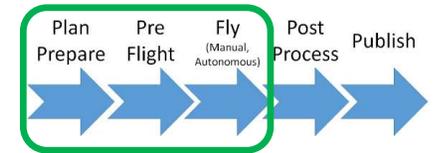
## Flying Smart, Flying Safe – How Are You Shooting/Capturing



- Manual Focus (MF) vs Auto Focus (AF) why avoid AFC in video: You don't want your focus shifting
  - Why avoid AWB on video: You don't want your colors shifting during your video
  - Orthophoto: Looking down for example a google or other map view
  - Oblique: Looking at something vs looking straight down
  - Bracketed (Photos): Use bracket for exposure and creating HDR looks
  - Burst (Photos): Rapid quick shots to capture movement or moving items
  - Time Delay (Photos): Delay before photo is captured
  - Timed (Photo): Capture image every "n" seconds, timelapse & orthophoto or façade
  - Timelapse: Capture image over time with resulting video and/or images
  - Hyperlapse: Timelapse where camera is moving capturing a subject over time
  - Some controllers have a Cine (Slow), Normal, Sport (Fast) speed switch for movement
  - Slow motion (video): Very fast frame rate (120fps, 240fps or higher) for slow playback
- Keep in mind, with video you can grab a frame and use it as a photo...

# Drone Aerial Photography & Videography

## Flying Smart, Flying Safe – Where Are You Flying

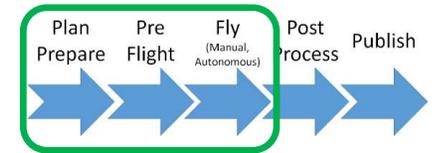


- Flying Indoors vs. Outdoors

- Outdoors FAA rules apply and weather can vary, especially when transiting in/out
- Indoors may have poor or no GPS along with poor lighting
- Learn to fly manually using your “sticks” for control, know your aircraft, stay heads up  
For example, how does aircraft/drone tend to drift or behave and adjust as needed
- Watch out for obstacles including things hanging from ceiling or elsewhere indoors
- Know where fans and HVAC ventilation are blowing or sucking air out indoors
- Also watch out for dust plumes as well as sucking up or blowing items around indoors
- Adjust WB and other camera settings as needed for various lighting
- For video you might have to lower your frame rate and boost ISO in low light
- Be aware of equipment and other electrical or RF interference inside
- Verify your signal loss or low battery action, e.g. RTH (not a good idea indoors)
- Be familiar with your flight area, coordinate with others, avoid surprises
- Utilize prop guards, prop cages, protection for and from rotating parts
- Leverage safety and common sense, avoid flying reckless, FPV outdoors = Needs VO

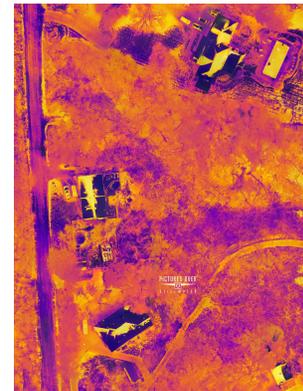
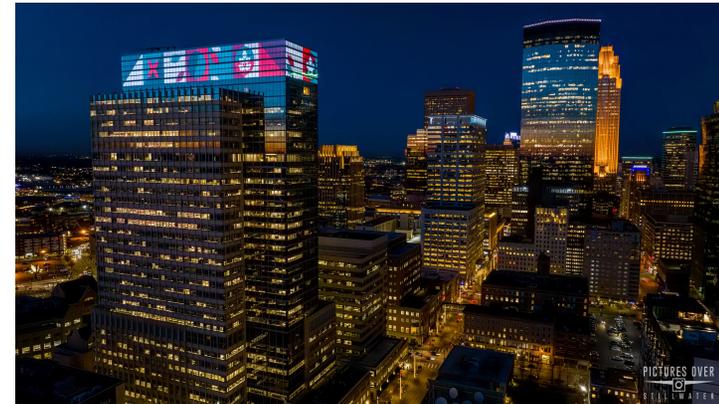
# Drone Aerial Photography & Videography

## Flying Smart, Flying Safe – When Are You Shooting/Capturing



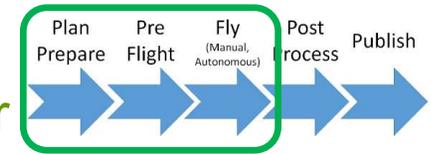
- Day vs. Night, Sunrise and Sunset

- Be familiar with night flying, know your subject area
- Leverage bright strobes on aircraft so others see you
- Have a VO help with watching aircraft and operation area
- Adjust WB for desired effect and lighting conditions
- Adjust your exposure, shutter, ISO and other settings
- Change or Remove ND Filters, use a UV filter if needed
- Higher ISO allows brighter image at night, can introduce noise (grainy)
- Find balance between your ISO, shutter, f stop and other settings
- Watch out for rolling shutter with video for fireworks
- Mindful of lens flare (unless you want it for looks)
- Avoid task saturation, stay heads up



# Drone Aerial Photography & Videography

Flying Smart, Flying Safe –Autonomous Missions, AI if you prefer



- Automated (Autonomous & Programmed) Missions

- Simple actions such as follow, tracking, orbits might be built-in
- Some have waypoint mission flying repeatable patterns & actions
- For example:



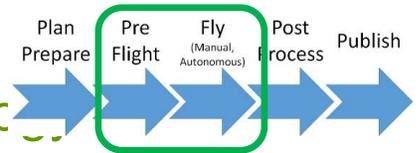
- Fly a rectangle or polygon grid taking photos at various interval (oblique or orthophoto)
- Fly a waypoint route where aircraft attitude and direction of flight controlled
- Actions at various waypoints or locations such as take a photo, stop/start video
- Some apps support multiple actions per waypoint, others allow manual actions
- Aircraft apps have various autonomous capability from none to advanced
- Some aircraft support 3<sup>rd</sup> party flight apps (Litchi, DroneDeploy, Dronelink, Pix4d etc)
- Test, verify your autonomous missions to make sure they do what you need them to do
- Monitor your aircraft visually (or have a VO) while its flying the mission
- Verify your signal loss, low battery and end of mission action such as RTH before flight
- Watch out for errant waypoints that result in your aircraft flying off to somewhere else...



Waypoints  
Point of Interest (POI)

# 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

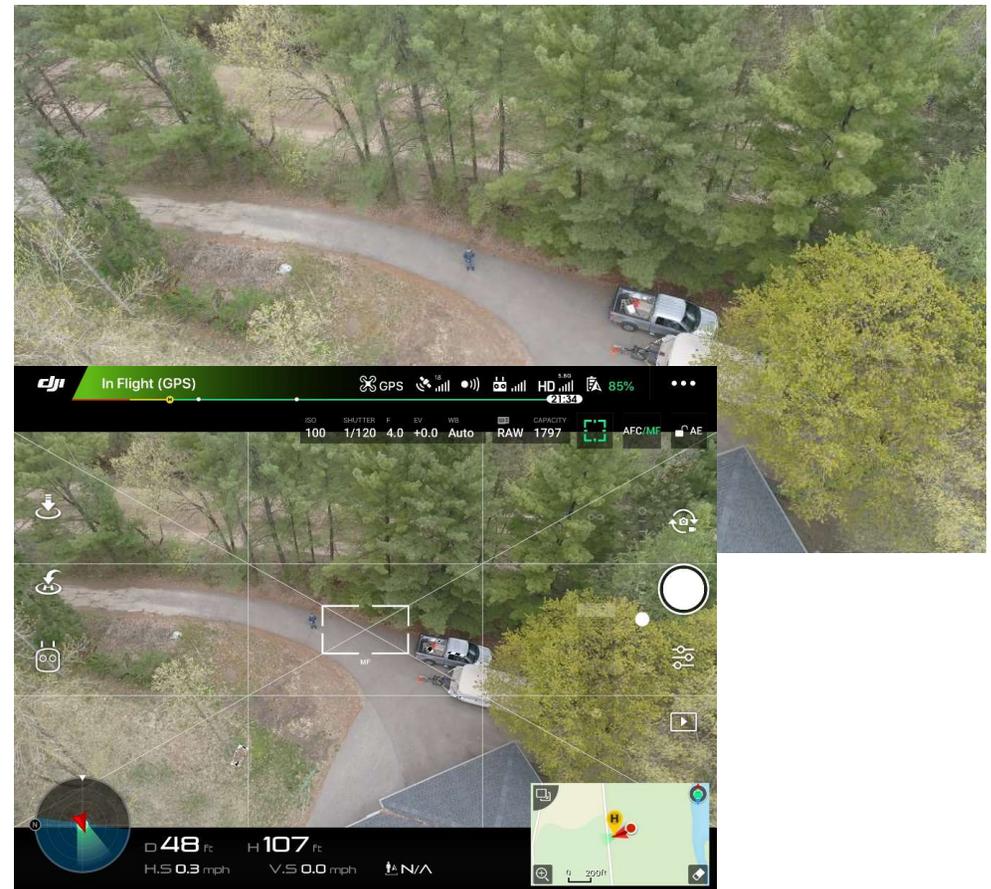
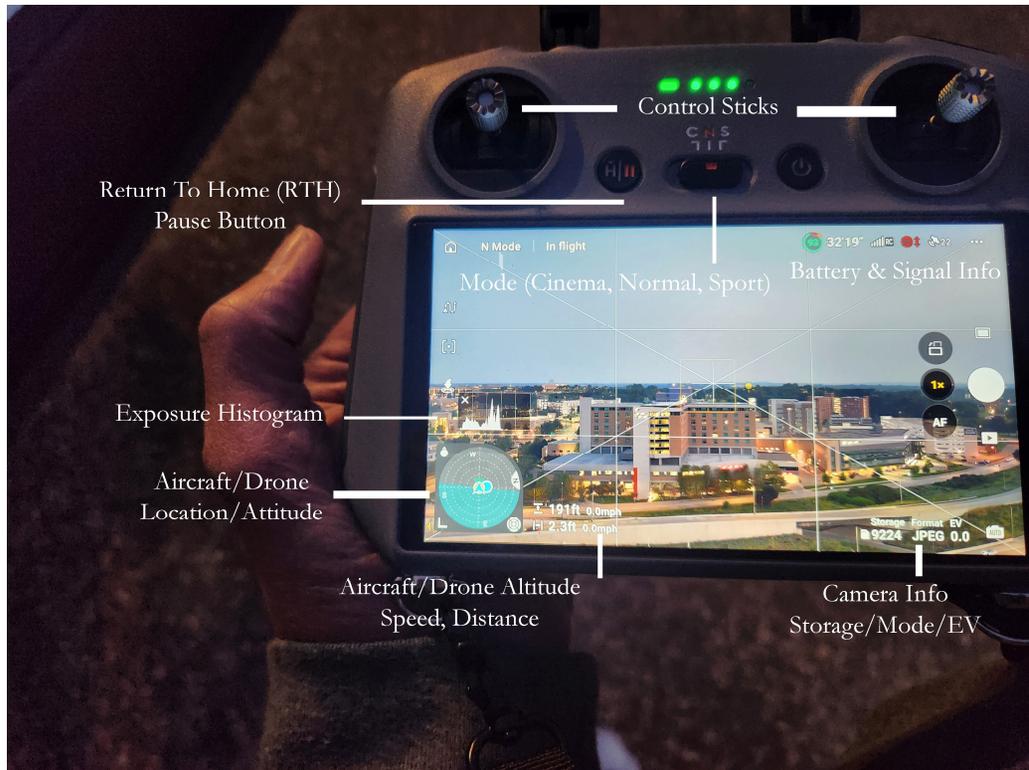
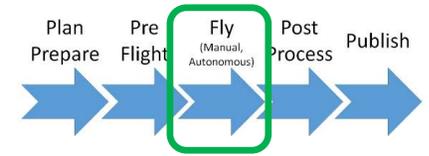
- *Autel Explorer, DJI Fly (Go & Go4 older DJI), DJI Pilot, DroneDeploy, Drone Harmony, Dronelink, Litchi & Pilot, Map Pilot, Pix4D Capture, Potensic, UgCS among others*

## 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*

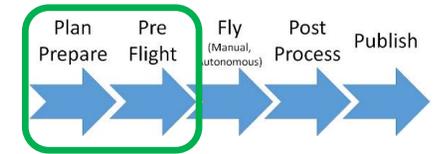
# Drone Aerial Photography & Videography

## Flying Smart, Flying Safe – In Flight, Flight Tools and Aids



# Drone Aerial Photogrammetry

## Flying Smart, Flying Safe –2D, 3D Digital Twins Models & Maps

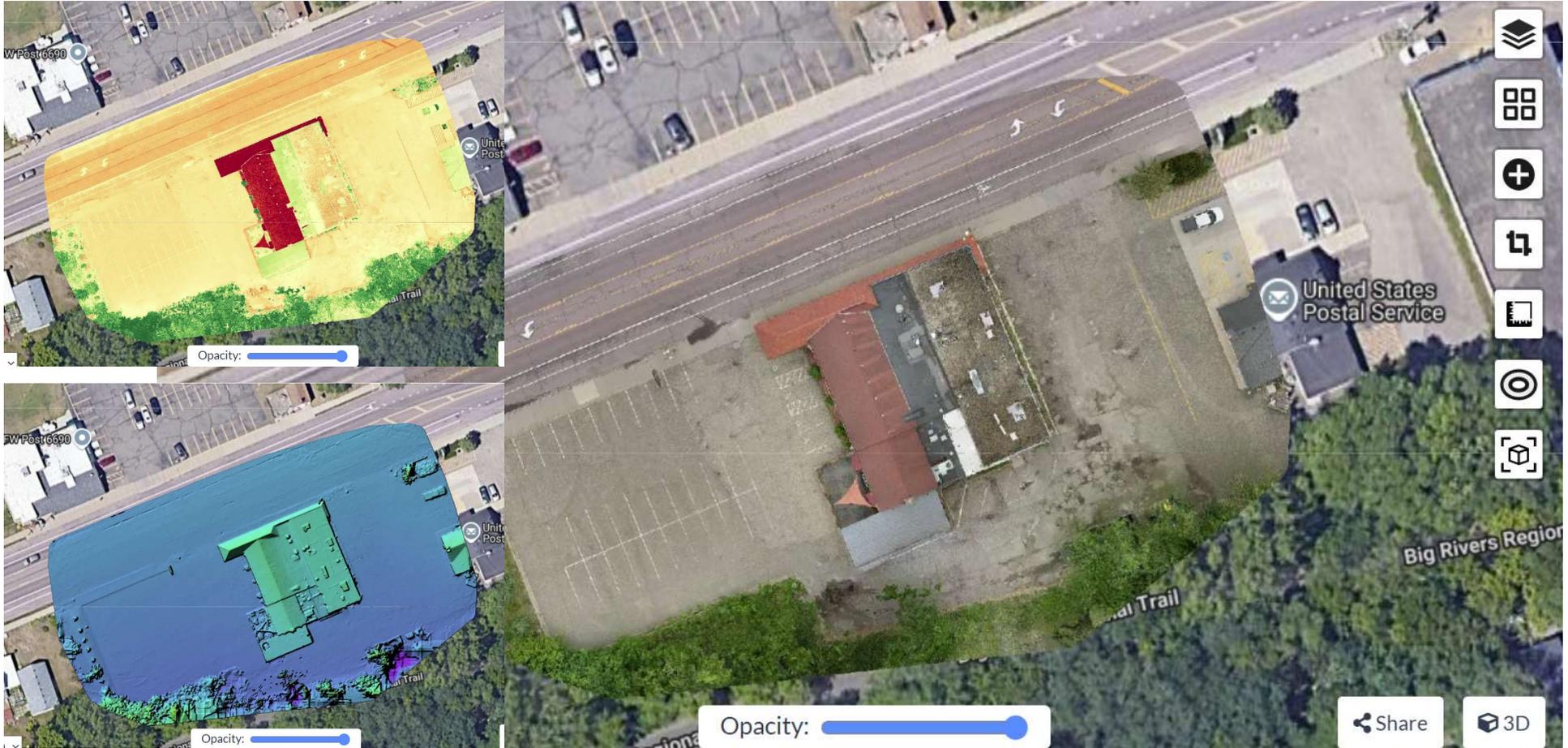
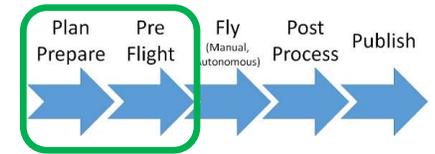


- Inspection, survey, image, mapping, model, construction, mining, agriculture, real estate
- Sensors and cameras (RGB, IR/FLIR, Radiometric, LIDAR, NDVI)
- Models, maps, surface and contours, volumes, progress reports
- 2D orthophoto, 3D, surface elevation, vegetation, cut & fill
- Flight planning and mission software (autonomous flights) (DJI, Litchi, DroneDeploy, Pix4D, Autel and others)
- Post processing software (DroneDeploy, Pix4D, WebODM, Agisoft Metashape many others)



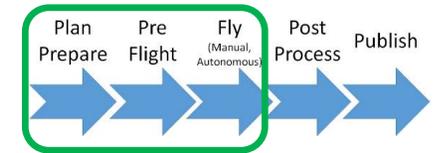
# Drone Aerial Photogrammetry

Flying Smart, Flying Safe –Orthophoto, Vegetation and Surface



# Drone Aerial Photography & Videography

Flying Smart, Flying Safe – Wind, Temp, Visibility, Low Clouds



Where Will You Be Flying From Relative To Your Subject  
How Will Weather Impact Your Flight Planning and Missions?

## Weather

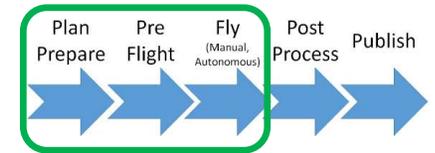
Surface and At Altitude  
Temp (Absolute & Wind Chill)  
Wind Speed, Direction  
Ceiling, Visibility, Precipitation  
Day and Night  
Sun Angle, Shadows



**Reminders: Stay 500' below clouds (Ceiling), have 3 mile visibility, Lights for Night, VLOS of Aircraft**

# Drone Aerial Photography & Videography

Flying Smart, Flying Safe –Cold Weather Flying



When Was The Last Time You Used Your Equipment?  
Is Your Equipment, HW, SW, Settings, Aircraft, Tools Ready To Fly?

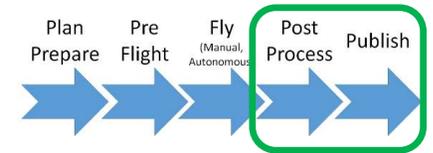
## Equipment

Batteries Charged, Keep Warm  
Acclimate Equipment  
Review Manufactures Specs  
Use of UV/ND Filters or Not  
Touch Pen for Touch Screens  
Inspect for Cracks or Damage



# Drone Aerial Photography & Videography

## Flying Smart, Flying Safe – Some Tools and Technology



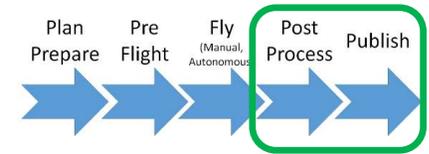
### Editing and Post Production Software Apps.

- **Photography:** *Adobe (PSE, PS, Cloud, etc), Affinity, Davinci Resolve, FastStone Image, Luminar Neo, and many others*
- **Compositing, Stitching, Panoramas:** *FSPViewer (360s), GoPro Player/Quic, Microsoft ICE, PTGui, Adobe (PSE, PS, etc.) and many others including IOS & Droid Apps, ODM*
- **Videography:** *Adobe (Premiere & Cloud), Camtasia, Davinci Resolve (BlackMagic), Final Cut, GoPro Quic, LightCut, Wondershare Filmora, Wondershare Uniconverter, Various IOS and Android among many others*
- **Various other tools:** *Mediainfo, Neatimage (Denoiser), Exiftool (360 metadata injector), Spatial Media Metadata Injector (<https://github.com/google/spatial-media/releases>) among many others*

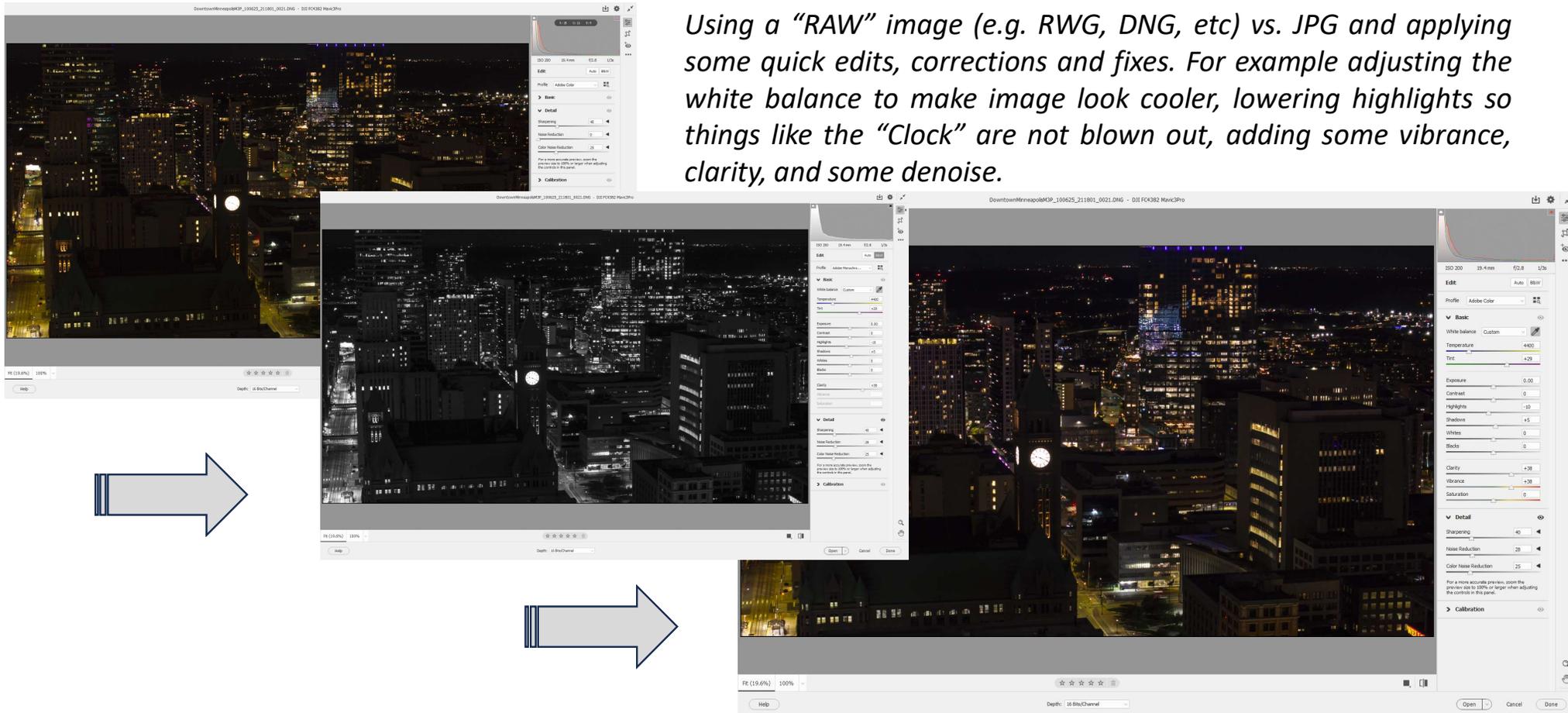
NLE (Non-Linear Editing) – E.g. Edit out of sequence from how footage was shot

# Drone Aerial Photography & Videography

## Flying Smart, Flying Safe – Example Processing “Raw” Image

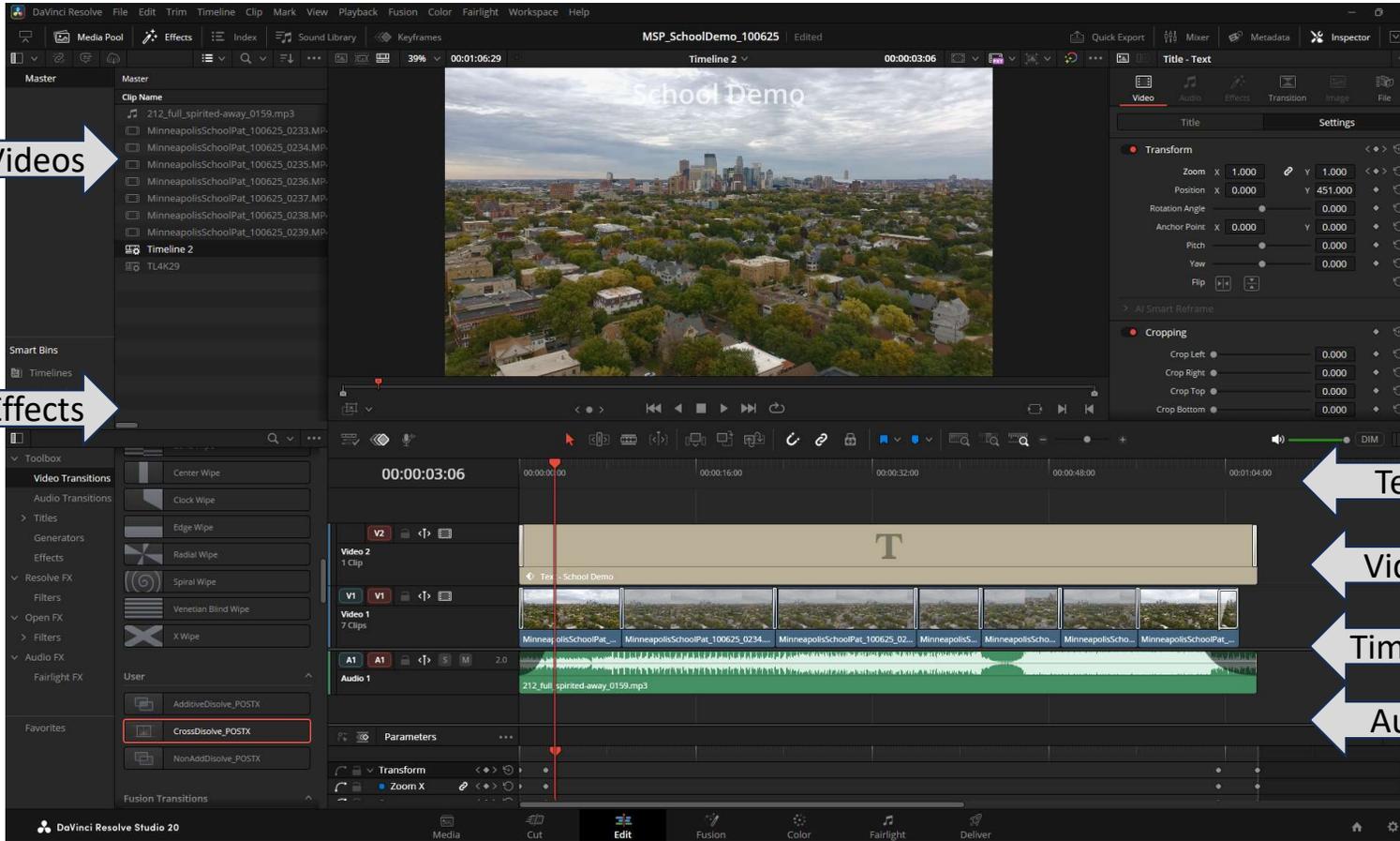
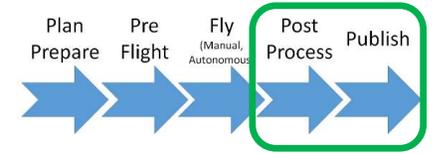


Using a “RAW” image (e.g. RWG, DNG, etc) vs. JPG and applying some quick edits, corrections and fixes. For example adjusting the white balance to make image look cooler, lowering highlights so things like the “Clock” are not blown out, adding some vibrance, clarity, and some denoise.



# Drone Aerial Photography & Videography

## Flying Smart, Flying Safe – Example Video Editing



*Simple video editing example using Davinci Resolve (Blackmagic Design) showing a basic timeline with text, videos,*

**Settings**

*And audio along with various effects.*

**Text**

**Videos**

**Timeline**

**Audio**

# Drone Aerial Photography & Videography

## Flying Smart, Flying Safe – Various Resources To Learn More

### 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/](https://www.faa.gov/uas/recreational_fliers/knowledge_test_updates/)
- B4UFLY (FAA Free App, Info, LAANC authorizations) - [faa.gov/uas/getting\\_started/b4ufly](https://www.faa.gov/uas/getting_started/b4ufly)
- 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/themightydrones](https://www.facebook.com/groups/themightydrones)
- 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 Aerial Photography & Videography

## Flying Smart, Flying Safe – Various Resources To Learn More



### 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](https://tfr.faa.gov/tfr2/list.html)
- ✓ [FAA The Recreational UAS Test \(Trust\)](https://www.faa.gov/uas/trust)
- ✓ [Skyvector.com](https://www.skyvector.com) & [vfrmap.com](https://www.vfrmap.com)
- ✓ <https://faadronezone-access.faa.gov/#/>
- ✓ <https://faasafety.gov>
- ✓ View more at [PicturesOverStillwater.com/links](https://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>

# Drone Part 2 – Aerial Photography and Video Community Ed Summer/Fall 2025

Thank You



PICTURES OVER  
STILLWATER



By Greg Schulz – Pictures Over Stillwater

FAA Part 107 & MnDoT Aeronautics Licensed Commercial Drone Operator  
Professional Photographer, Videographer and FPV - MN FAAS Team Rep DronePro

[PicturesOverStillwater.com/links](https://PicturesOverStillwater.com/links) | [facebook.com/PicturesOverStillwater](https://facebook.com/PicturesOverStillwater)  
[vimeo.com/picturesoverstillwater](https://vimeo.com/picturesoverstillwater) | [twitter.com/POStillwater](https://twitter.com/POStillwater) | [Instagram.com/PicturesOverStillwater](https://Instagram.com/PicturesOverStillwater)  
[picturesoverstillwater.smugmug.com](https://picturesoverstillwater.smugmug.com) | [youtube.com/@picturesoverstillwater](https://youtube.com/@picturesoverstillwater)