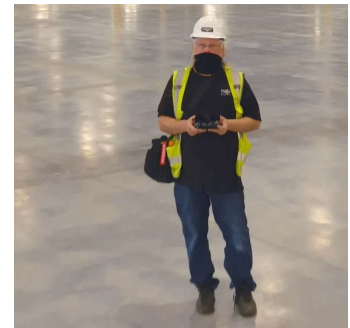
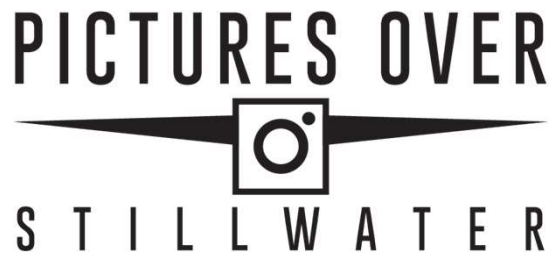


Drone Part 2 – Aerial Photography and Video

Community Ed Winter/Spring 2026



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

Drone Aerial Photography & Videography

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 (FAASafetyTeam) 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/>

Federal Aviation Administration

Home About the FAASafety Team

Search FAASafety Website

Activities, Courses, Seminars & Webinars Maintenance Hangar Pilots Resources

FAA Safety Team | Safer Skies Through Education

Featured Courses

- Earn WINGS or AMT Credit by completing one of our featured online courses!
- Pilot Deviations: Root Cause Analysis
- Health as a Human Factor: Solvents (AMT Core Course 2024)
- Conducting Preflight Self-Briefings for Student and VFR Pilots
- Part 107 Small UAS Resource
- Part 107 Small UAS Resource - Part 61 Pilots
- Part 107 Small UAS Initial - Part 61 Pilots
- DC SFRA

Hot Topics

Possible Assistance Needed

Check out the latest FAA Safety Briefing here!

Upcoming Seminars

Thousands of aviation safety seminars take place annually around the nation. Find one near you.

Zip: miles: Search

FAA Safety Team Login

FAA/DOE Employee or Contractor LOGIN

External User

Login: Enter Email Address My Email Has Changed

Password: Forget Password / Help / Go

AMT Awards AC 65-25

The AMT Awards program encourages AMTs and employers to take advantage of initial and recurrent training by issuing awards based on training received.

WINGS AC 61-91J

Instructor Portal

By virtue of holding instructor privileges, instructors can validate or give immediate WINGS credit through this portal.

WINGS Achievements

We are excited to report that 60,101 pilots have earned at least one phase in the WINGS - Pilot Proficiency Program, and these pilots have earned a total of 255,056 phases.

FAASafety Directory

Search by phone number, first or last name, city or state, position or keyword.

FAASafety Industry Members

FAASafety Industry Members are industries, organizations, businesses and associations that support the FAASafety Team at a national level and who have a vested interest in aviation safety. Click below for more information.

FAA YouTube

Offices

- Flight Standards District Offices (FSDO)
- Runway Safety
- FAA For...
- Pilots
- Mechanics
- Other Aviation Professionals
- Educators & Students

Forms

- FAA Forms
- Handbooks & Manuals
- Aircraft
- Aviation
- Examiner & Inspector
- Aircraft Certificates
- Type Certificate Data Sheets (TCDS)
- Supplemental Type Certificates

Accidents & Incidents

- Accident & Incident Data
- Preliminary Accident & Incident Data
- Aeronautical Navigation Products
- Airport Diagrams
- (G-CS) formerly the Airport/Facility Directory
- Terminal Procedures (d-TFP)

Regulations & Guidelines

- Advisory Circulars
- Airworthiness Directives
- Federal Aviation Regulations (FAR)
- Orders & Notices
- Temporary Flight Restrictions

Other Popular FAA Sites

- Airmen Inquiry
- Airmen Online Services
- FAA Registry Aircraft Inquiry

U.S. Department of Transportation
Federal Aviation Administration
800 Independence Avenue, SW
Washington, DC 20591
1-866-TELL-FAA (1-866-835-5322)

Web Policies
Web Policies & Notices
Privacy Policy
Accessibility

Government Sites
DOT.gov
USA.gov
PlainLanguage.gov
Regulations.gov
Data.gov

Contact Us
Help - FAQs
Contact Us
Hours: Monday - Friday
10:00 AM to 4:00 PM EST
faasafety@faa.gov

faasafety.gov/FAASTApp/directory/default.aspx

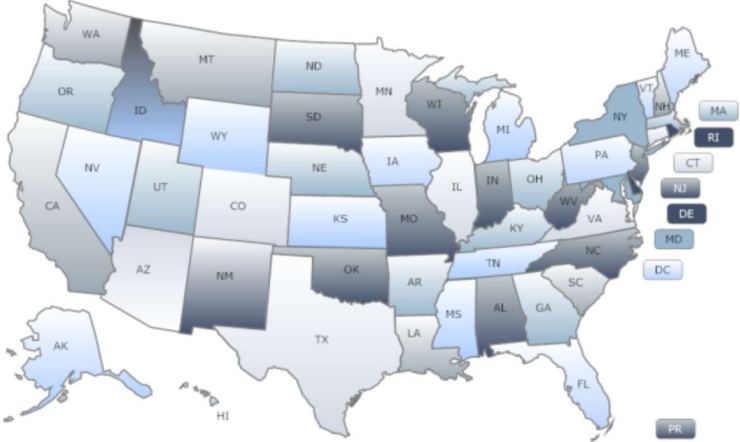
Select at least one or the following positions in your report

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

Search

☒ Click to Hide Map

Click a State to view find FAASafety leaders by state.



U.S. Department of Transportation
Federal Aviation Administration

Web Policies
Web Policies & Notices

Government Sites
DOT.gov

Contact Us
Help - FAQs

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

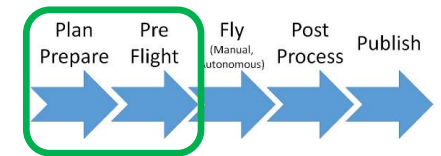
What & Where Is Your Subject

Weather Conditions

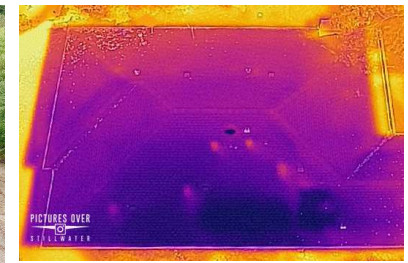
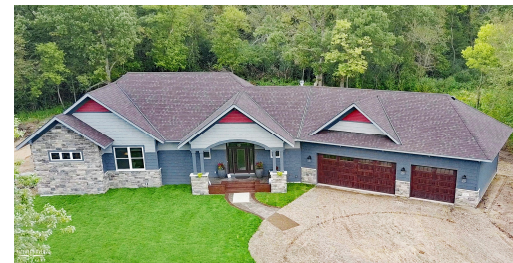
Day, Night, Wind
Clouds, Visibility

Drone Aerial Photography & Videography

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



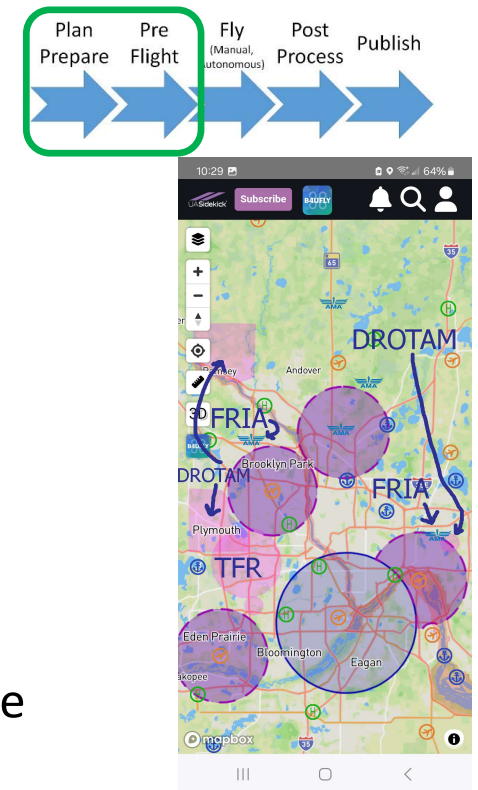
- Whats different from being up in the air?
 - Aspect ratios, perspectives and elevations
 - Seeing things from different view vantage points
 - Clouds, sky, water glare, shadows and reflections
 - Birds, aircraft and other drones in the area
 - Airspace and ground location restrictions
 - Staying out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

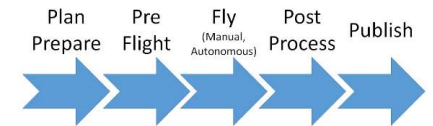
General Reminders – Drone Rules and Regulations

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.

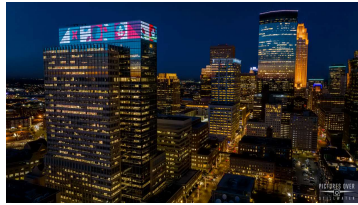
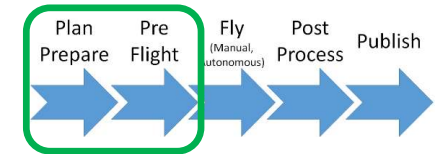
Post-Flight: Safe and stow equipment, let batteries cool before storing and charging, repair equipment, make any notes about repairs or incidents encountered during flight to follow up, offload images from MicroSD card or aircraft to other device. Rename folders and files as needed as part of workflow.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



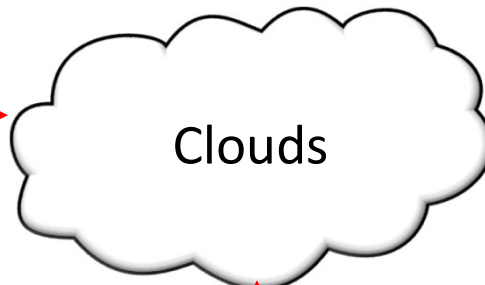
3 statue mile
visibility



OOP/OOMV



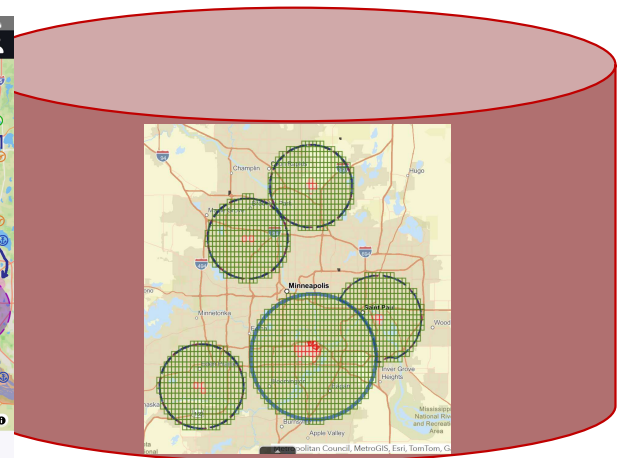
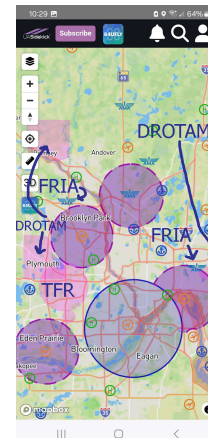
Stay 2000'
Horizontal
From Clouds



Stay 500'
Below
Clouds E.g. Ceiling

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.)?



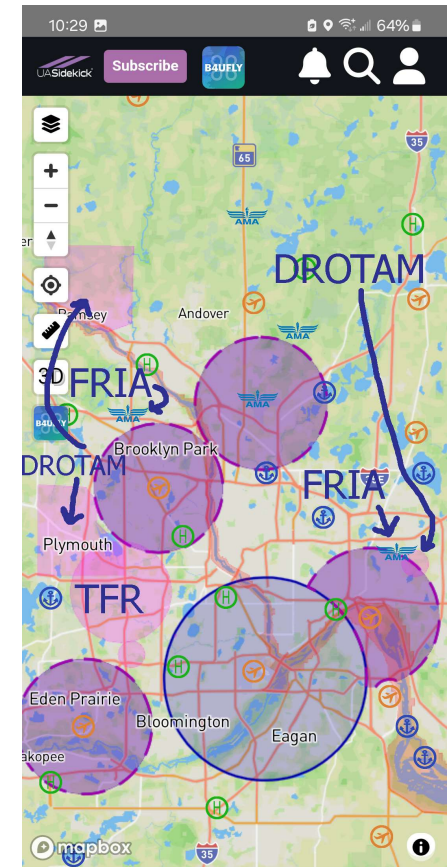
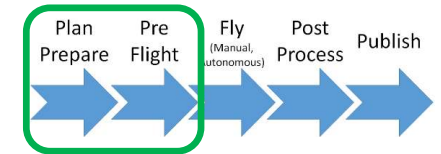
- (1) Hobby/Rec limited to 400' AGL in uncontrolled, All Alt in Controlled are absolute unless waiver or special authorization
- (2) OOP / OOMV requires waiver and/or special category of aircraft and avoid flying low and reckless

Drone Aerial Photography & Videography

General Reminders – Safety Tips For Before and During Flights

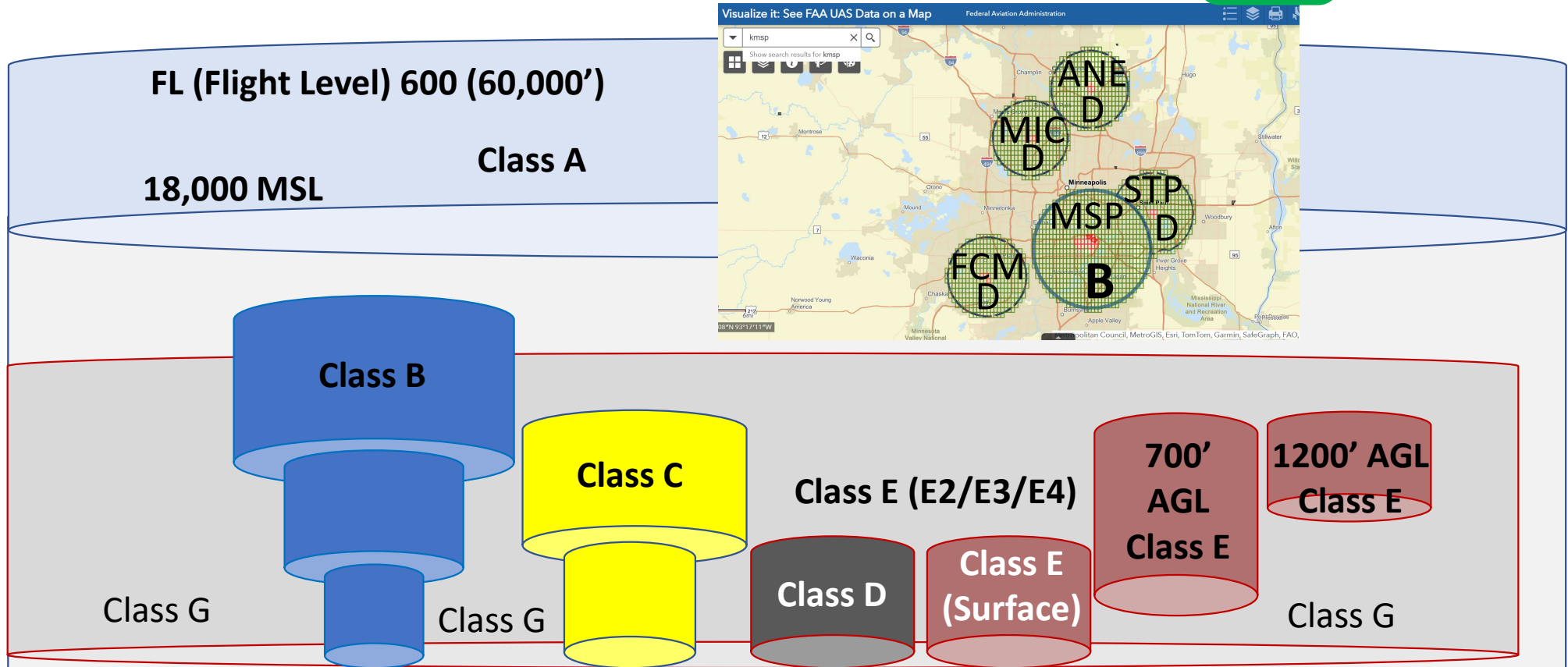
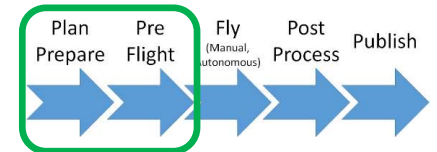
1. Follow FAA Part 107 or Hobby/Rec CBO / TRUST rules
2. Plan ahead and be prepared, use checklists:
 - Weather conditions (wind, temp, ceiling, visibility)
 - Location (Airspace, Ground Permissions, Obstacles)
 - Do you need and have Airspace Authorizations
 - Are there any TFRs or other airspace concerns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

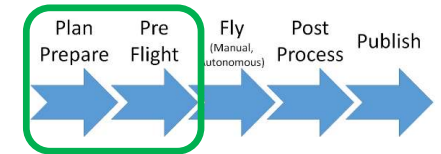


https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/media/17_phak_ch15.pdf

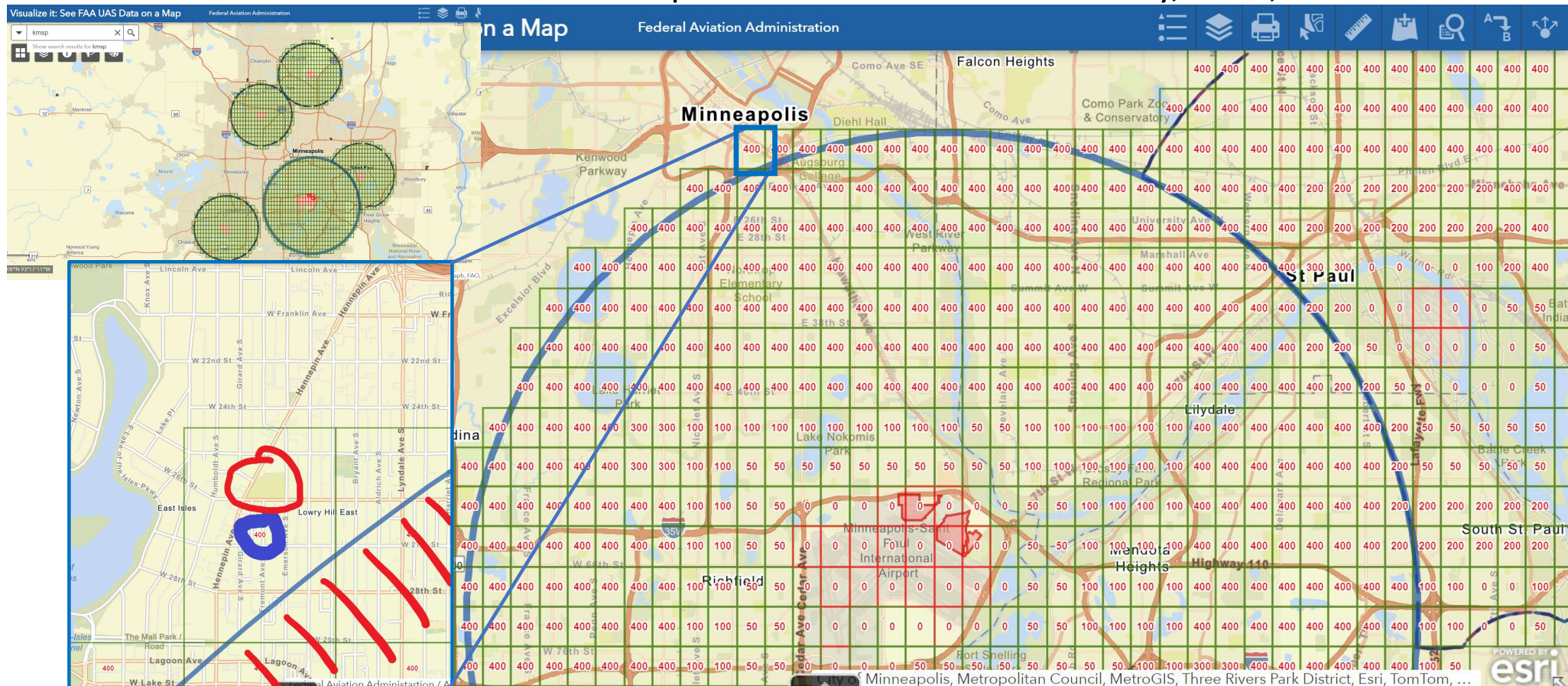
Use Apps such as UAVForecast, B4UFLY, UASidekick, Foreflight, Aloft Aircontrol & others for planning and insight

Drone Aerial Photography & Videography

Flying Smart, Flying Safe – Planning - Airspace Considerations?

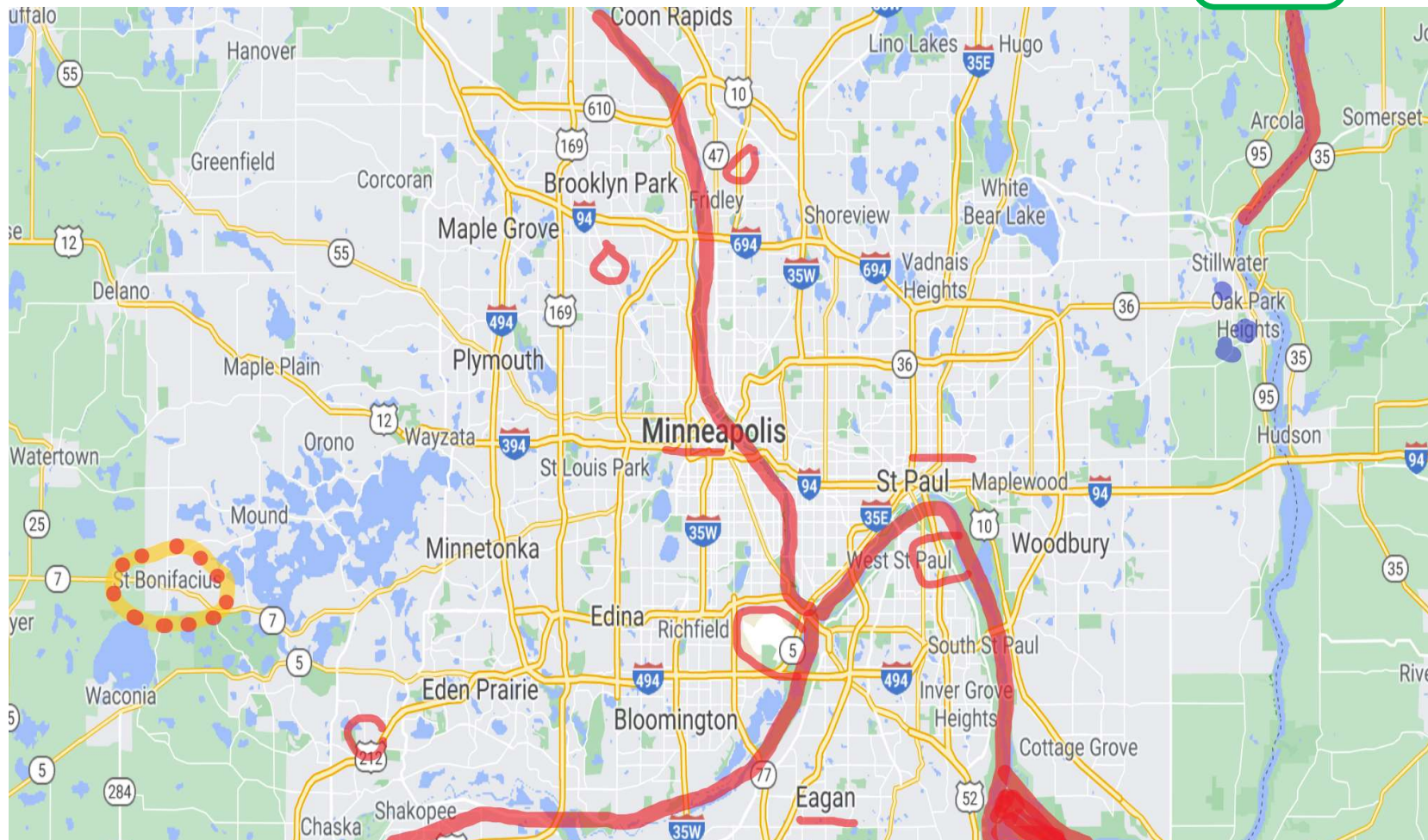
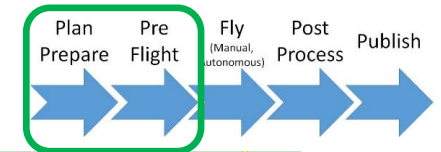


Via FAA Visualize It – To Get LAANC Airspace Authorization Use B4UFly, Aloft, & Others



Drone Aerial Photography & Videography

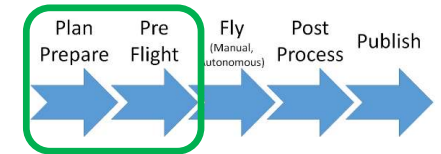
Flying Smart, Flying Safe – Planning - Ground Considerations?



Drone Aerial Photography & Videography

Flying Smart, Flying Safe – Airspace, TFRs & NOTAMS

Via notams.aim.faa.gov/notamSearch/nsapp.html#/



Also see tfr.faa.gov/tfr2/list.html

FAA FNS NOTAM Search

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 C FLAGG
STP	3/8113	Procedure	12/20/2023 1634	12/20/2025 1634EST	SID ST 13: STA
STP	4/7458	Procedure	04/05/2024 1921	09/30/2024 1921EST	ODP S PROC
STP	04/006	Obstruction	04/11/2024 0111	08/09/2024 0111	STP OF U/S 240
STP	03/001	Obstruction	03/05/2024 0600	07/03/2024 0600	STP OF U/S 240
STP	05/002	Services	05/01/2024 1238	05/30/2024 2000EST	RWY 3:
STP	05/003	Services	05/01/2024 1239	05/30/2024 2000EST	RWY 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	Communic	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

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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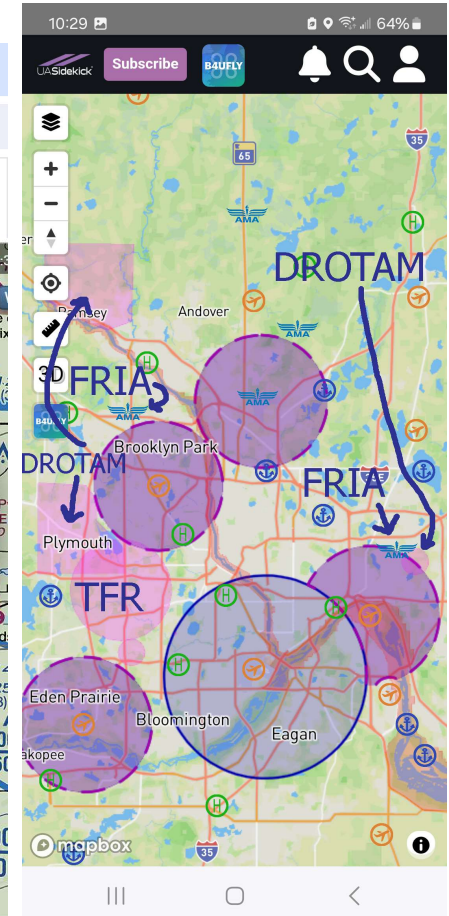
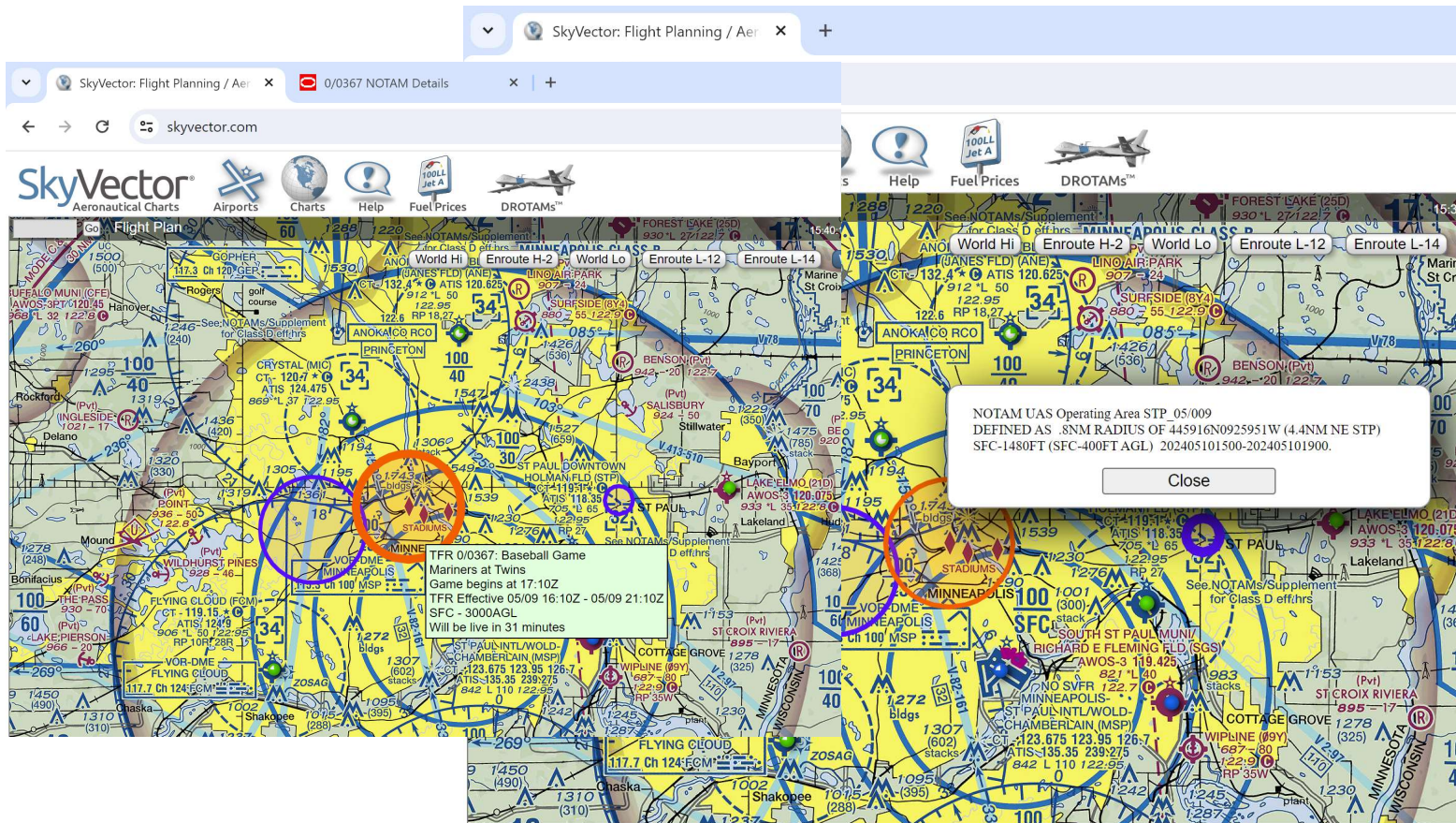
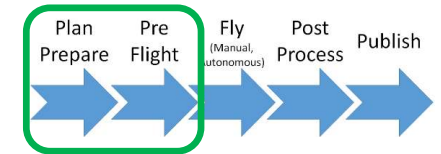
Government Sites
[Transportation.gov](https://www.transportation.gov)
[USA.gov](https://www.usa.gov)
[Plainlanguage.gov](https://www.plainlanguage.gov)
[Regulations.gov](https://www.regulations.gov)
[Data.gov](https://www.data.gov)

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

Drone Aerial Photography & Videography

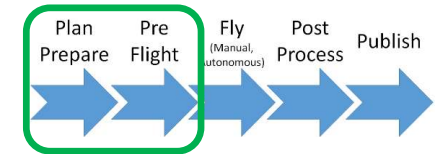
Flying Smart, Flying Safe – Airspace, TFRs & NOTAMS

Via Skyvector and UASidekick



Drone Aerial Photography & Videography

Flying Smart, Flying Safe – What Are You Capturing?



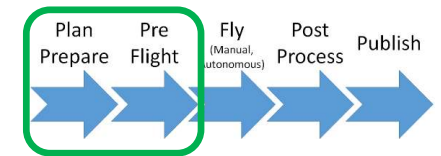
- Understanding your mission or objectives helps determine:
 - Are you looking for action (fast) or cinematic look (smooth)?
 - Are you flying manually or via autonomous modes?
 - What settings to use (e.g. WB, ISO, FPS, Resolution, style, EV, log)
 - Fixed or stationary subject and move slow = lower 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



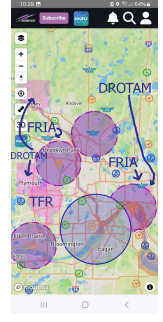
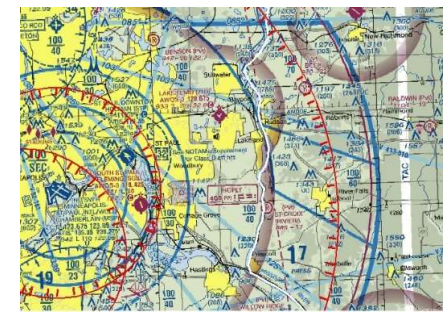
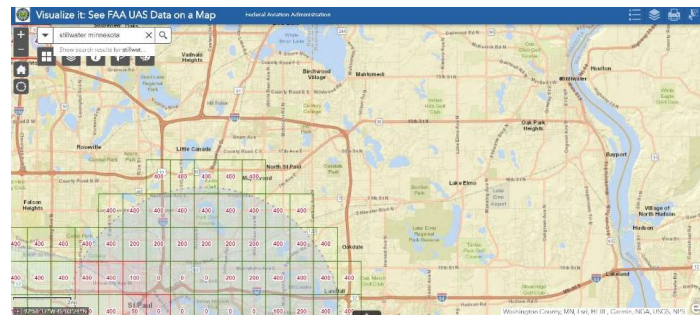
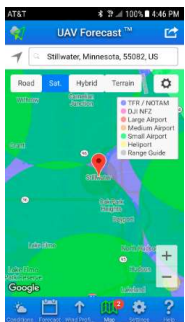
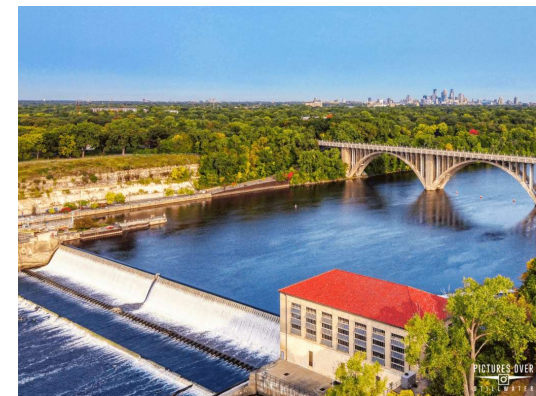
- Tips for Smooth Capture**
- ✓ Use “Cine” Mode Controls
 - ✓ Adjust Controller Sticks ESC
 - ✓ Fly slow and smooth
 - ✓ Leverage tracking modes
 - ✓ Pay attention to wind

Drone Aerial Photography & Videography

Flying Smart, Flying Safe – Plan & Prepare



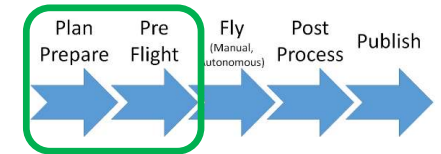
- Will you be flying from a new location and/or, in new or controlled airspace?
- Do you have airspace authorizations, any TFRs or DROTAMS?
- What are the obstacles (people, trees, buildings, towers)?
- How far and high will you fly? How long at destination?
- What are your emergency and contingency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



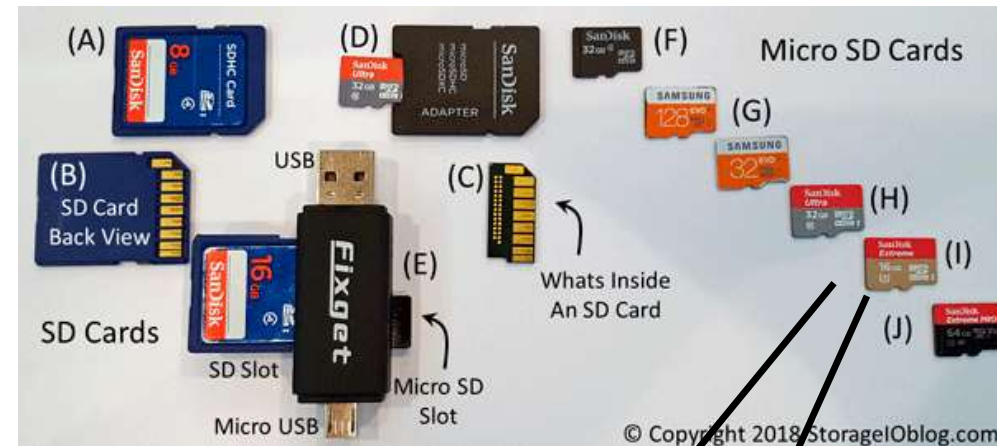
Use Apps such as UAVForecast, B4UFLY, UASidekick, Foreflight, Aloft Aircontrol & others for planning and insight

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



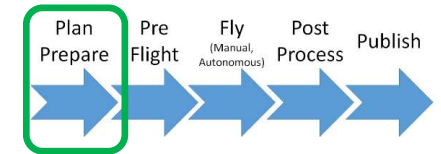
V ₉₀	90MB/s	8K
V ₆₀	60MB/s	4K
V ₃₀	30MB/s	4K
V ₁₀	10MB/s	HD
V ₆	6MB/s	SD

U³ = UHS 30MB/s

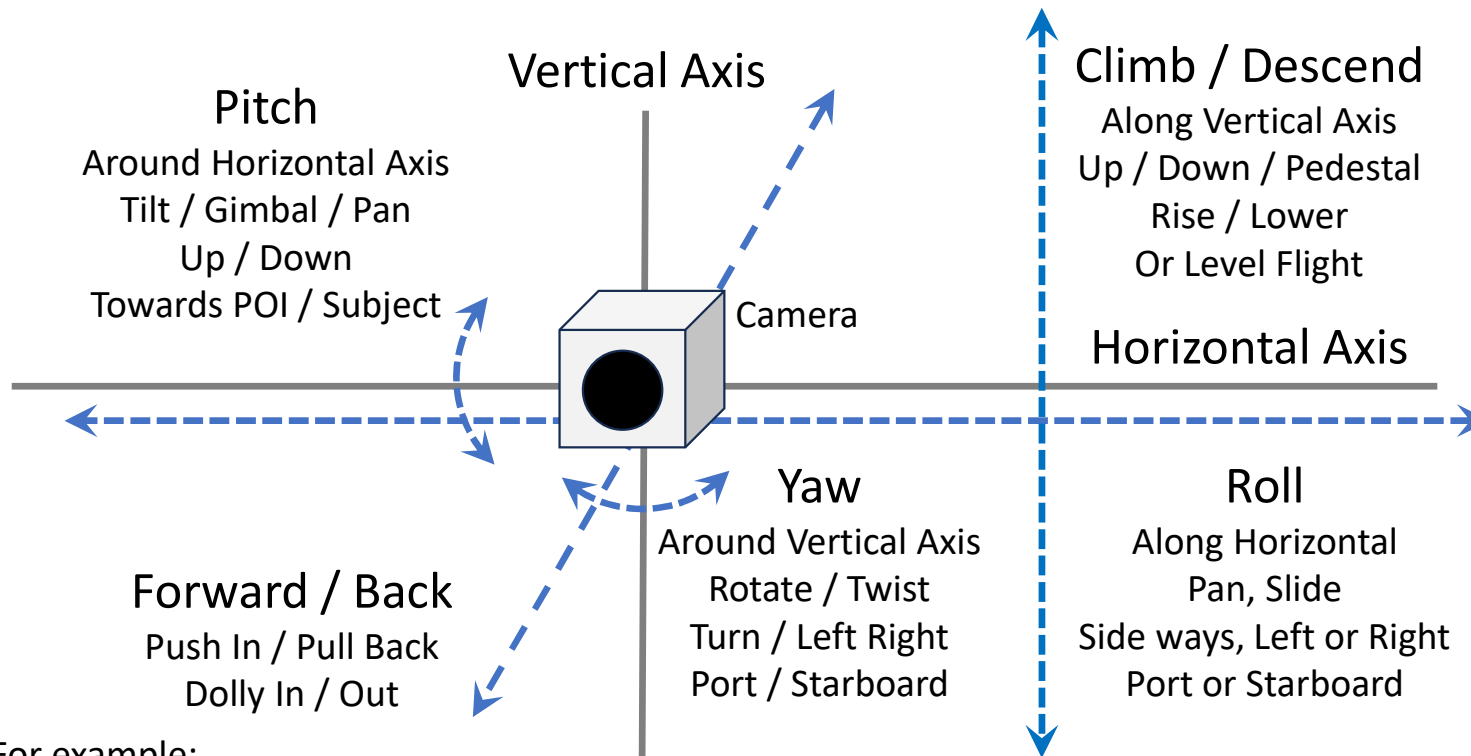
U¹ = UHS 10MB/s

Drone Aerial Photography & Videography

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



Subject = POI (Point of Interest)



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

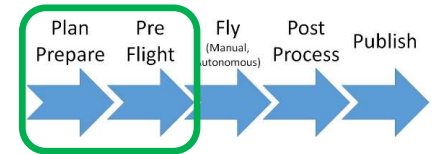
For example:

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

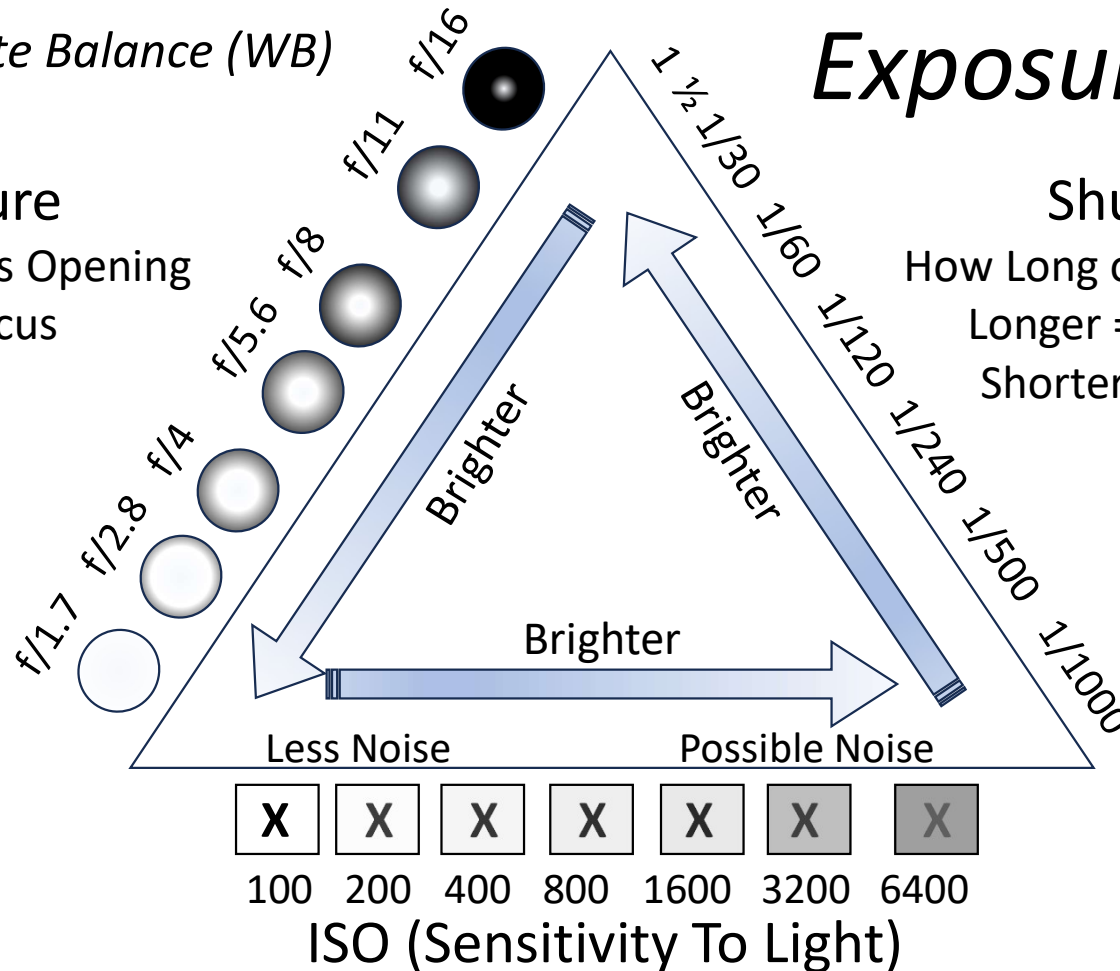


Also consider White Balance (WB)

Exposure Triangle

Aperture

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



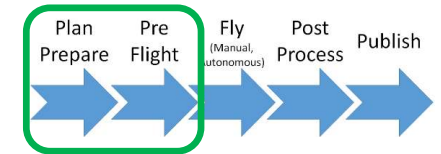
Shutter Speed

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



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

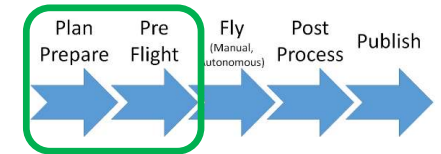
Note: Some cameras & drones have global settings, others are per camera, some are common for photo and video.



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

16:9

4:3

3:2

1:1

Aspect Ratios

Drone Aerial Photography & Videography

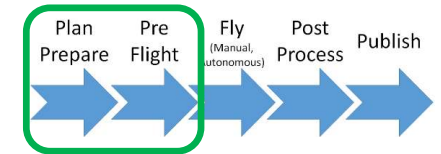
Flying Smart, Flying Safe – Camera Settings

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.

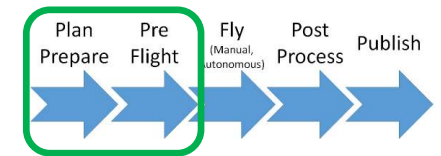


Parallax Compressed Background



Drone Aerial Photography & Videography

Flying Smart, Flying Safe – Various Types of Panoramas

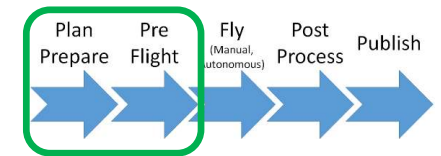


- Panoramas: Vertical, Horizontal, Wide, 180, 360 spherical
 - Vertical (tall subjects), Horizontal (wide subjects), very wide, 360 spherical
 - Various projections (fisheye, flat horizon, wrap around, tiny planet)
 - Also to create ultra high resolution large images beyond camera specs.
 - Manual or 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

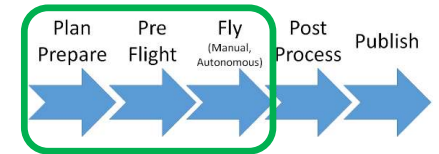


- Special Panoramas for large, high resolution images
 - Where viewer will be very close to the image when its enlarged to avoid pixilation



Drone Aerial Photography & Videography

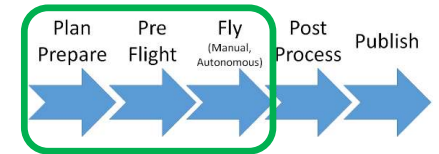
Flying Smart, Flying Safe – How Are You Shooting/Capturing



- 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

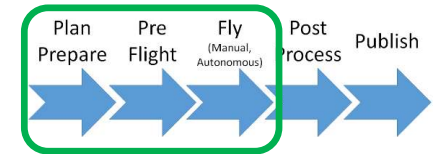


- Flying Indoors vs. Outdoors

- 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

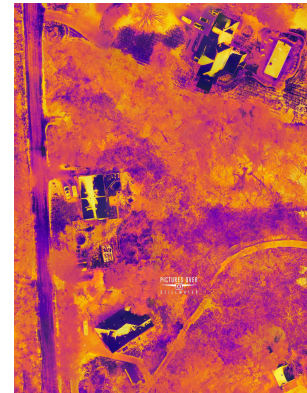
Drone Aerial Photography & Videography

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



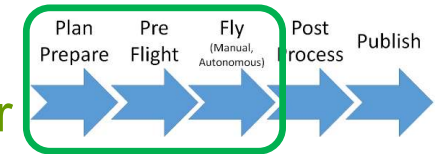
- Day vs. Night, Sunrise and Sunset

- 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

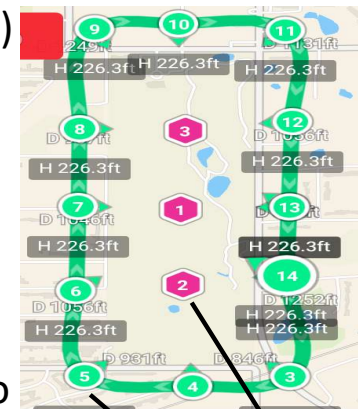


- Automated (Autonomous & Programmed) Missions

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



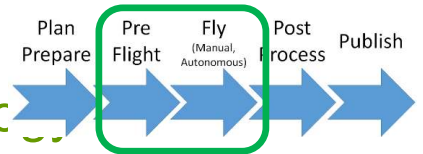
- Fly a rectangle or polygon grid taking photos at various interval (oblique or orthophoto)
- Fly a waypoint route where aircraft attitude and direction of flight controlled
- Actions at various waypoints or locations such as take a photo, stop/start video
- Some apps support multiple actions per waypoint, others allow manual actions
- Aircraft apps have various autonomous capability from none to advanced
- Some aircraft support 3rd 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

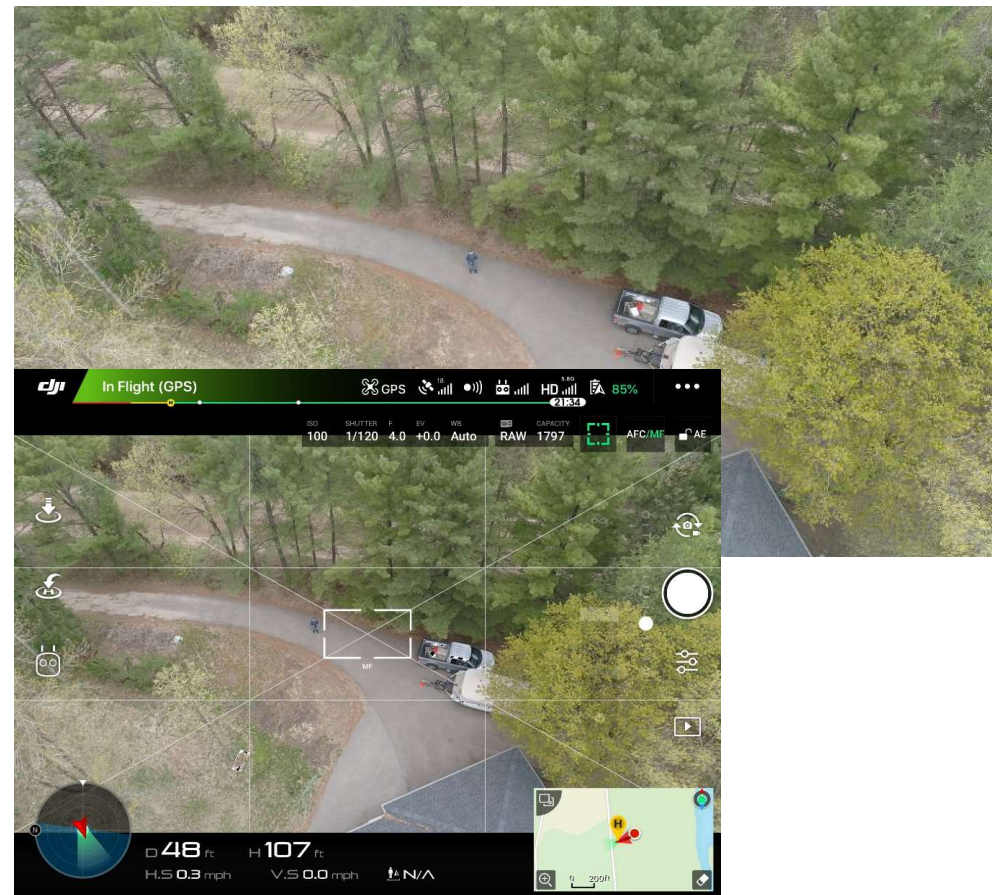
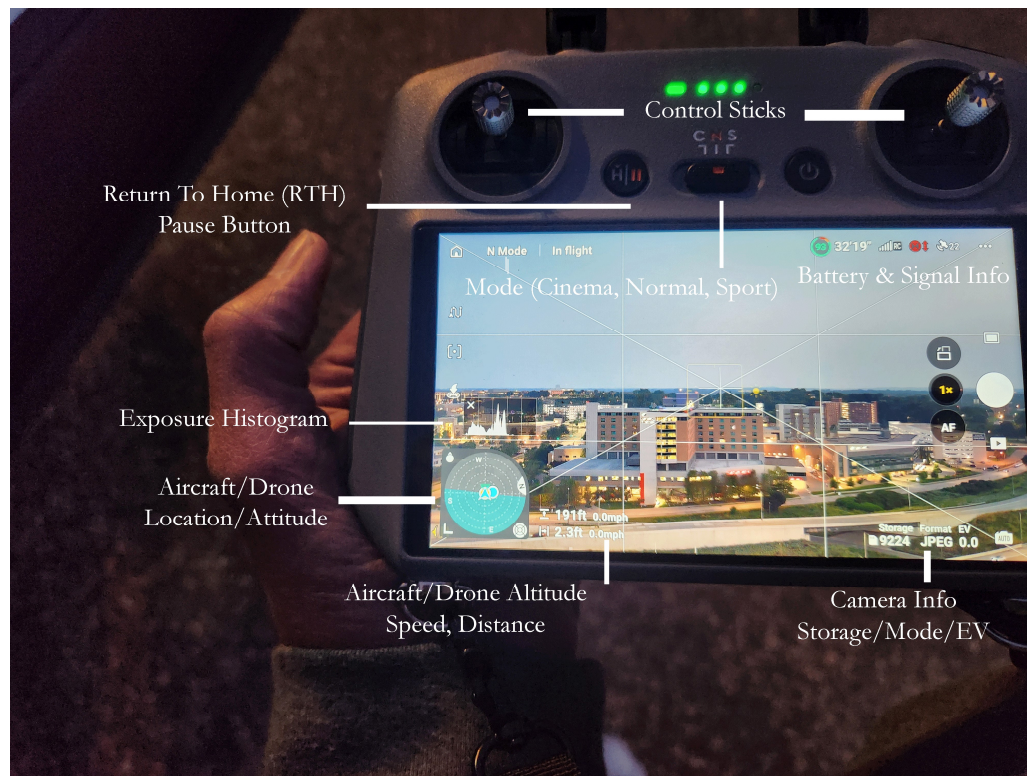
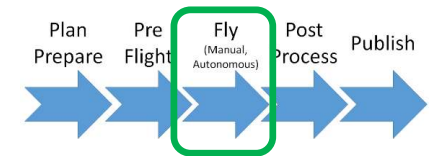
- *Autel Explorer, DJI Fly (Go & Go4 older DJI), DJI Pilot, DroneDeploy, Drone Harmony, Dronelink, Litchi & Pilot, Map Pilot, Pix4D Capture, Potensic, UgCS among others*

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*

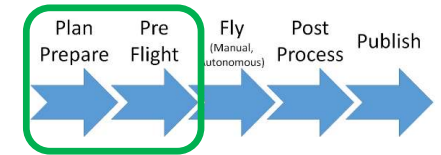
Drone Aerial Photography & Videography

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



Drone Aerial Photogrammetry

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

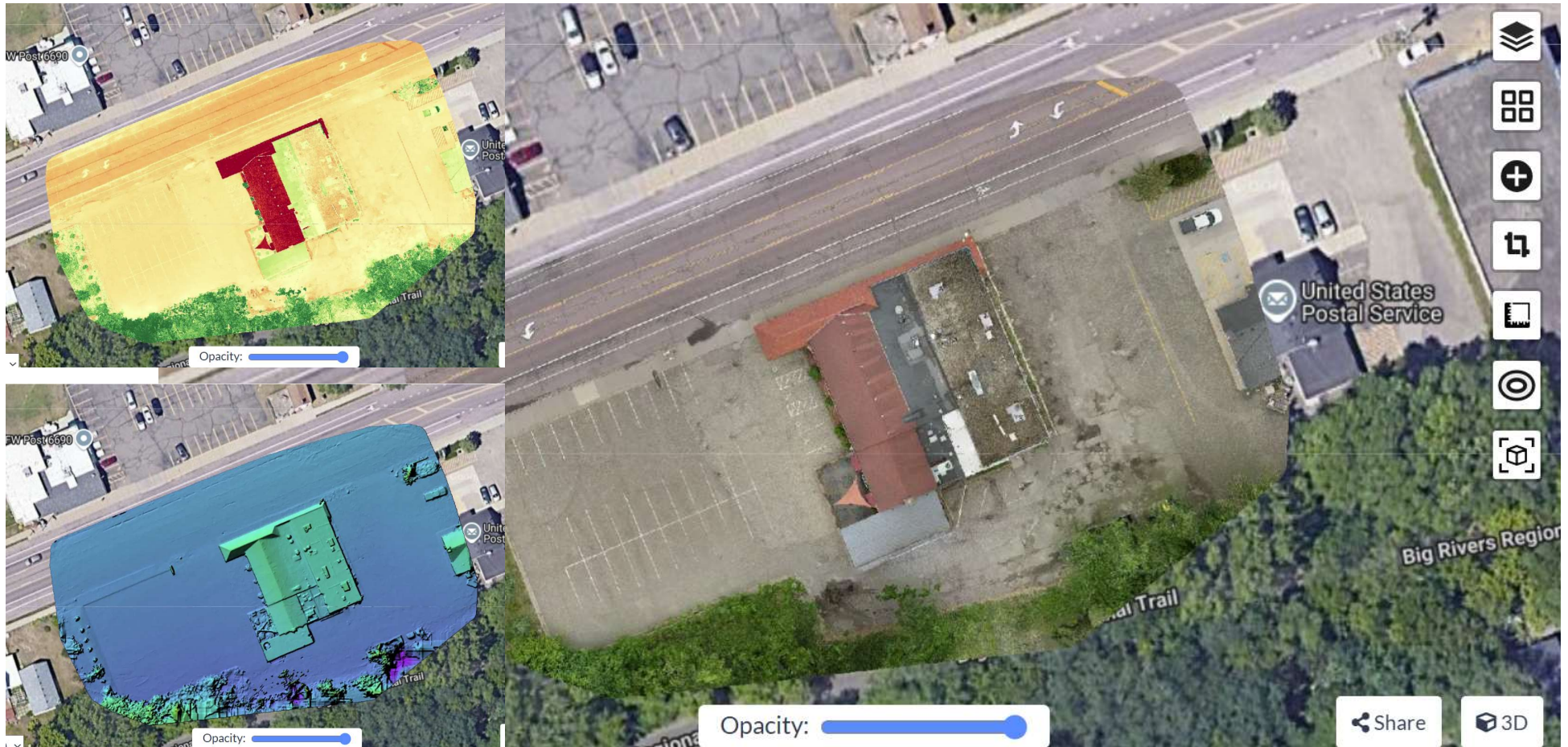
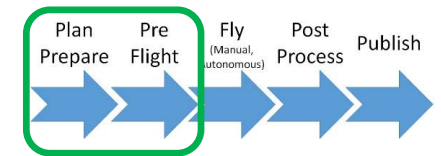


- Inspection, survey, image, mapping, model, construction, mining, agriculture, real estate
- Sensors and cameras (RGB, IR/FLIR, Radiometric, LIDAR, NDVI)
- Models, maps, surface and contours, volumes, progress reports
- 2D orthophoto, 3D, surface elevation, vegetation, cut & fill
- Flight planning and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



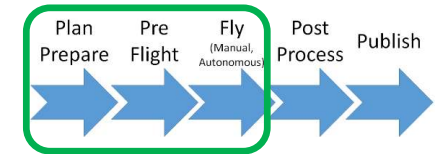
Drone Aerial Photogrammetry

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

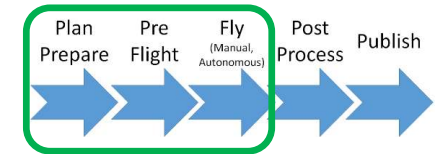
Surface and At Altitude
Temp (Absolute & Wind Chill)
Wind Speed, Direction
Ceiling, Visibility, Precipitation
Day and Night
Sun Angle, Shadows



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?

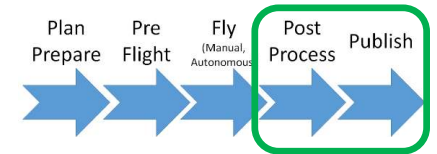
Equipment

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



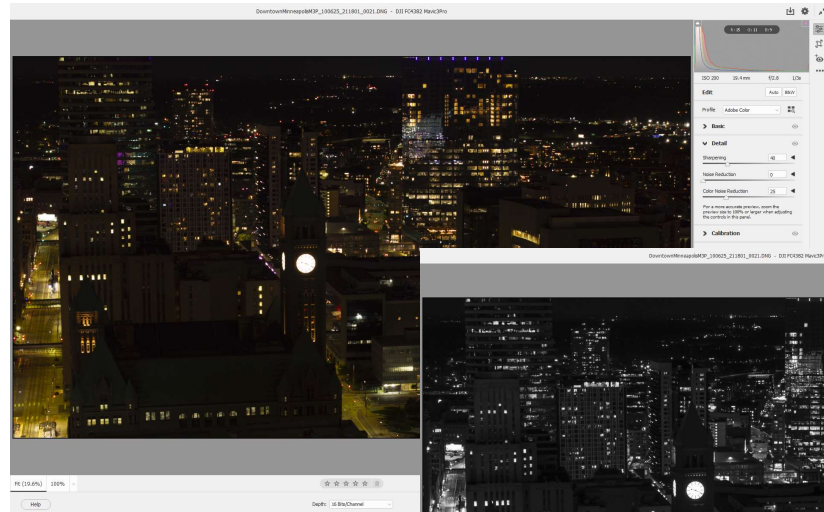
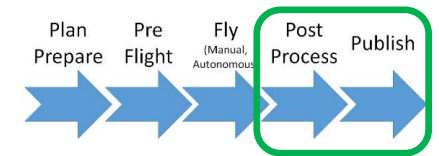
Editing and Post Production Software Apps.

- **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*

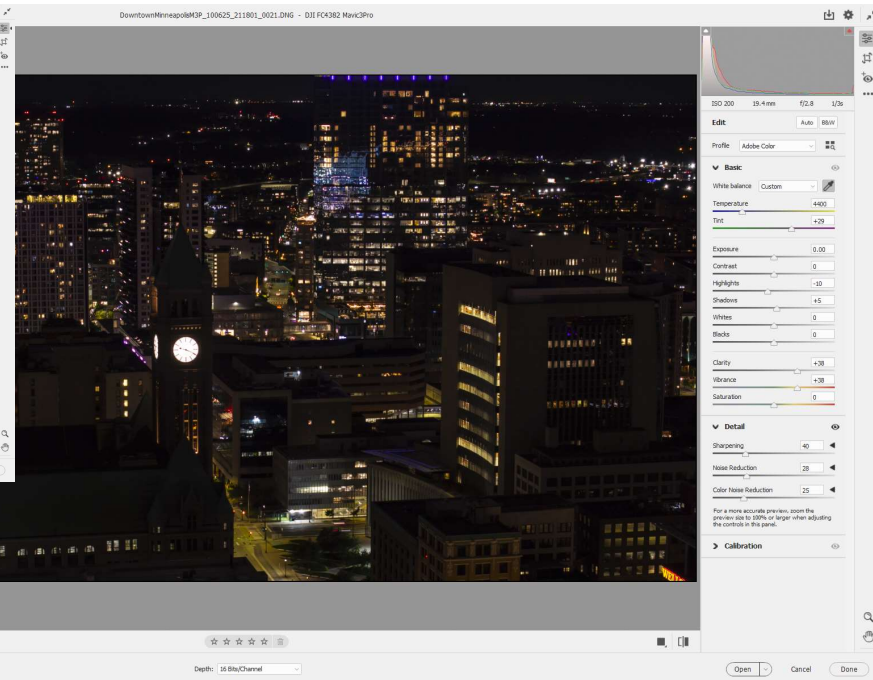
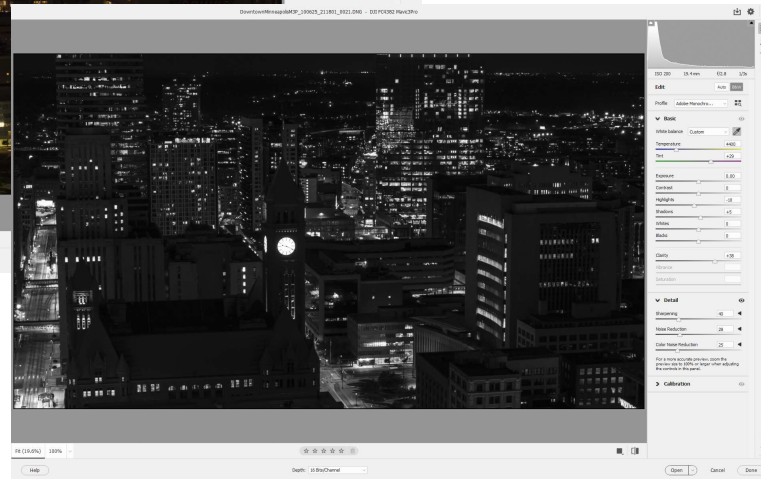
NLE (Non-Linear Editing) – E.g. Edit out of sequence from how footage was shot

Drone Aerial Photography & Videography

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

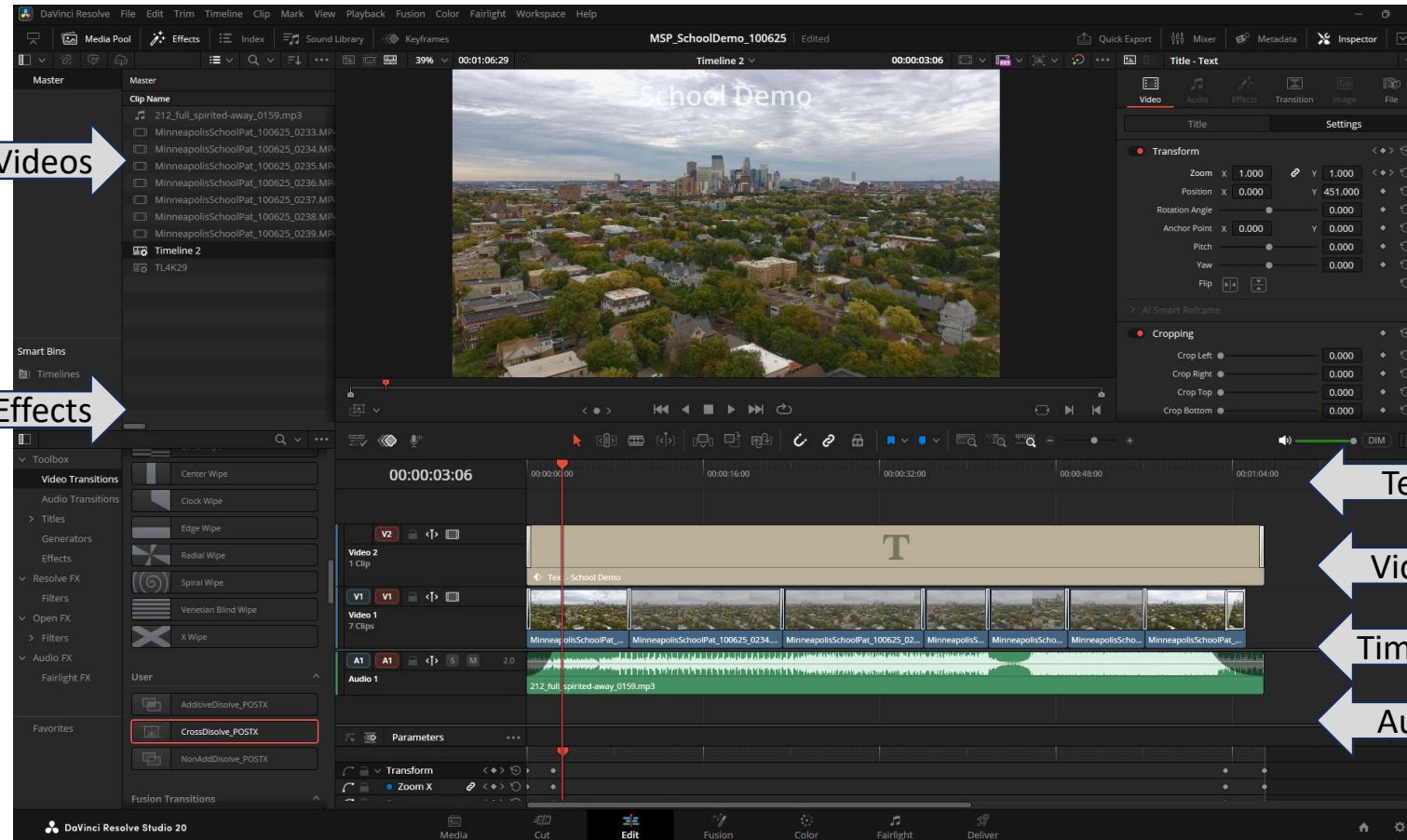
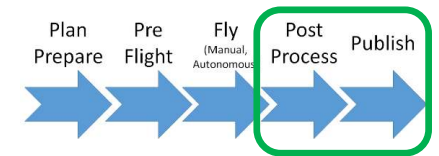


Using a “RAW” image (e.g. RWG, DNG, etc) vs. JPG and applying some quick edits, corrections and fixes. For example adjusting the white balance to make image look cooler, lowering highlights so things like the “Clock” are not blown out, adding some vibrance, clarity, and some denoise.



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://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 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
- ✓ [FAA The Recreational UAS Test \(Trust\)](https://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>

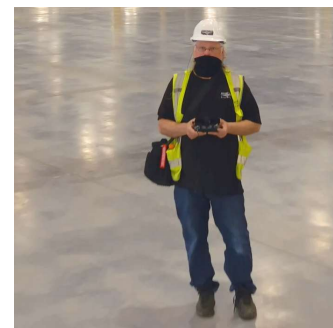
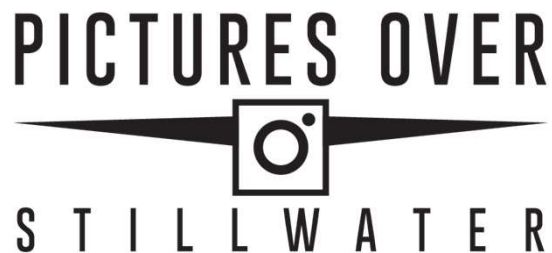
Part 107 Small Unmanned Aircraft Systems (small UAS) Initial

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

Drone Part 2 – Aerial Photography and Video

Community Ed Winter/Spring 2026

Thank You



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