Drone Part 2 – Aerial Photography and Video
Community Ed Winter/Spring 2026

PICTURES OVER STILLWATER

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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

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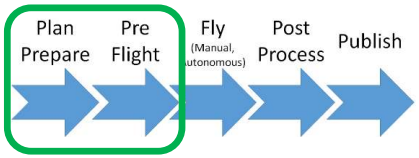
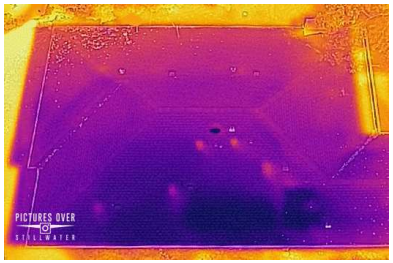
Drone Aerial Photography & Videography

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***



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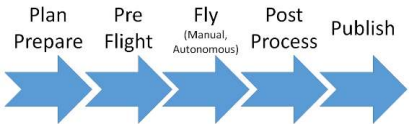
Drone Aerial Photography & Videography

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

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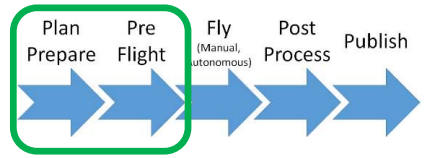
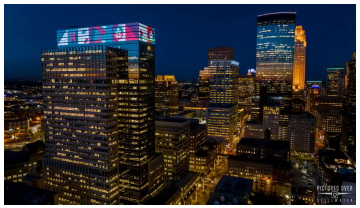
Drone Aerial Photography & Videography

General Reminders – Drone Rules and Regulations





Stay 2000’ Horizontal From Clouds

Clouds

Stay 500’ Below Clouds

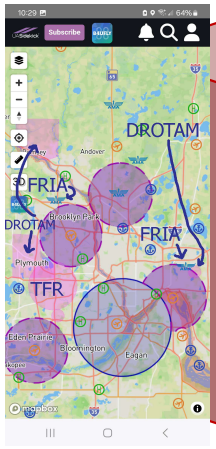
E.g. Ceiling

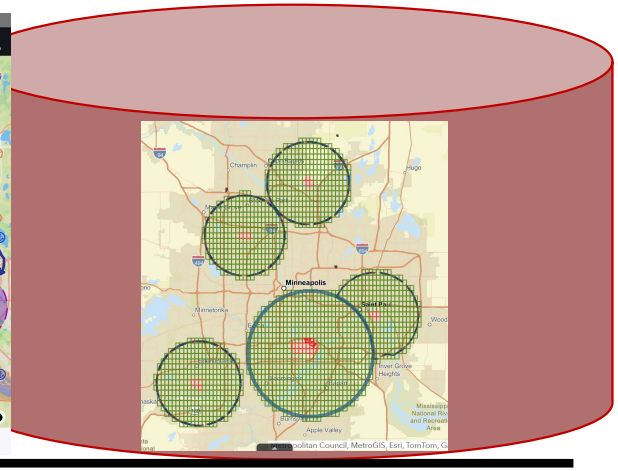
3 statue mile visibility

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

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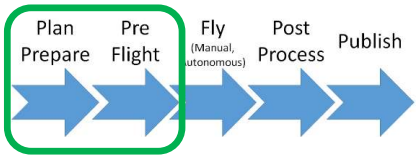
Drone Aerial Photography & Videography

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

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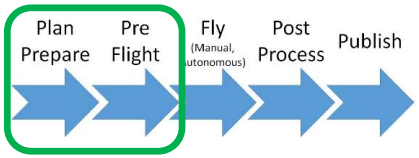
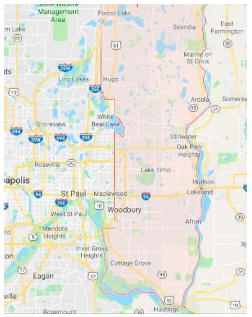
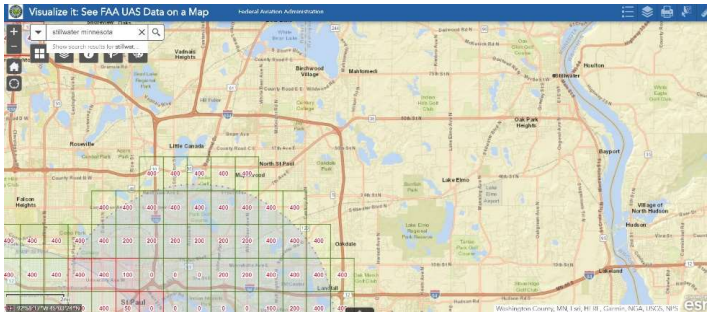
Drone Aerial Photography & Videography

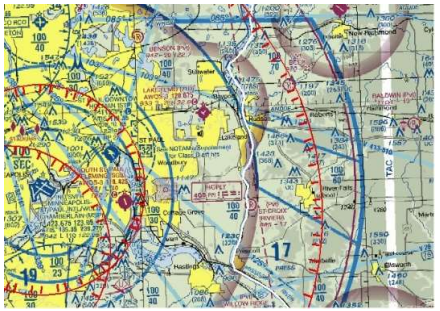
Flying Smart, Flying Safe – Plan & Prepare

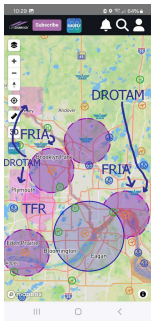


- Will you be flying from a new location and/or, in new or controlled airspace?
- Do you have airspace authorizations, any TFRs or DROTAMS?
- What are the obstacles (people, trees, buildings, towers)?
- How far and high will you fly? How long at destination?
- What are your emergency and contingency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

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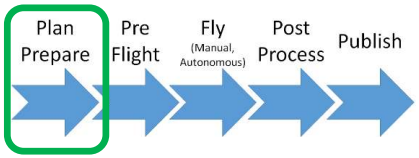
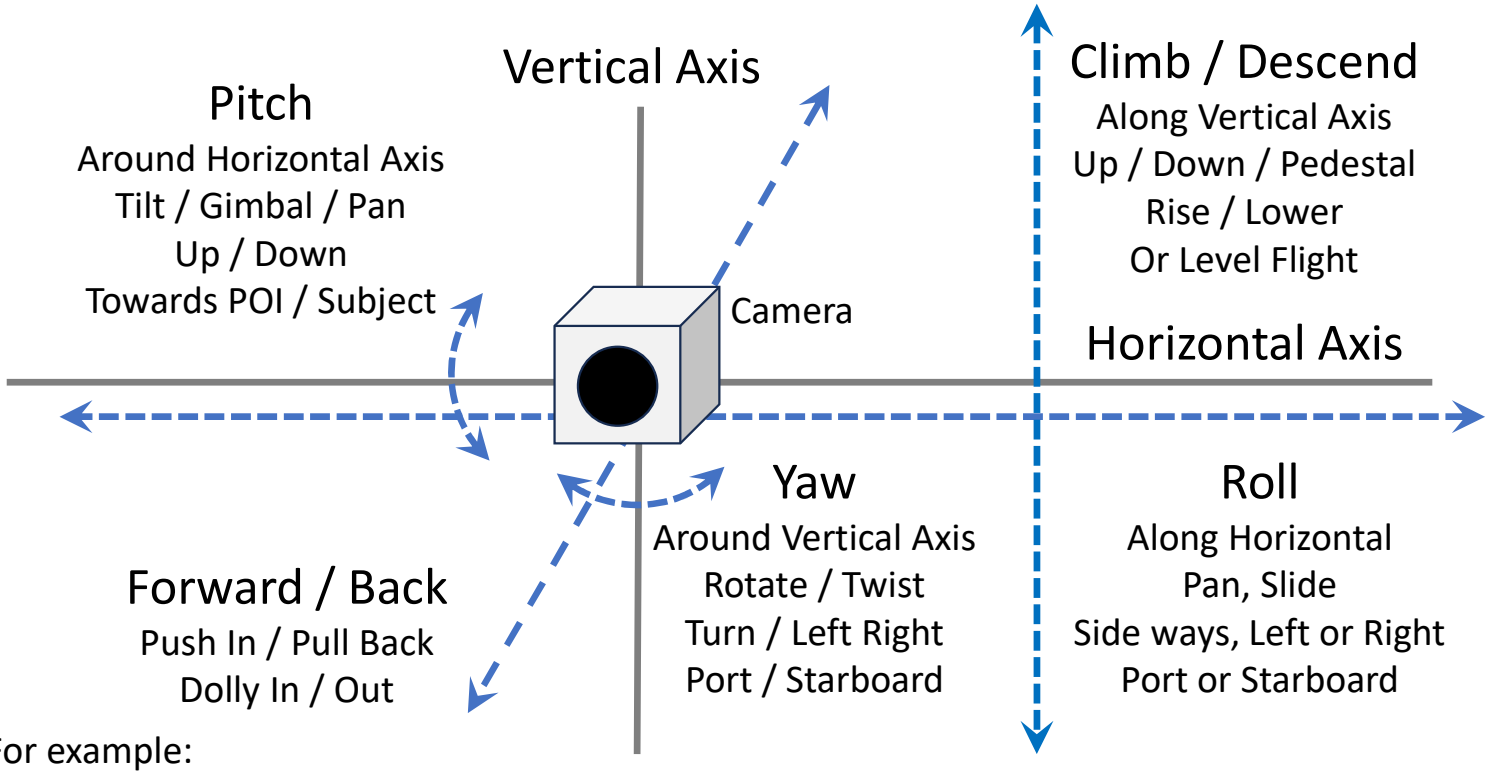
Drone Aerial Photography & Videography

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’

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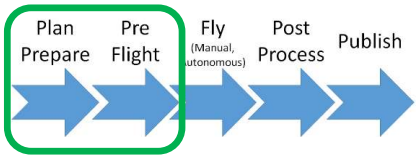
Drone Aerial Photography & Videography

Flying Smart, Flying Safe – Camera Settings, Exposure Triangle



Also consider White Balance (WB)

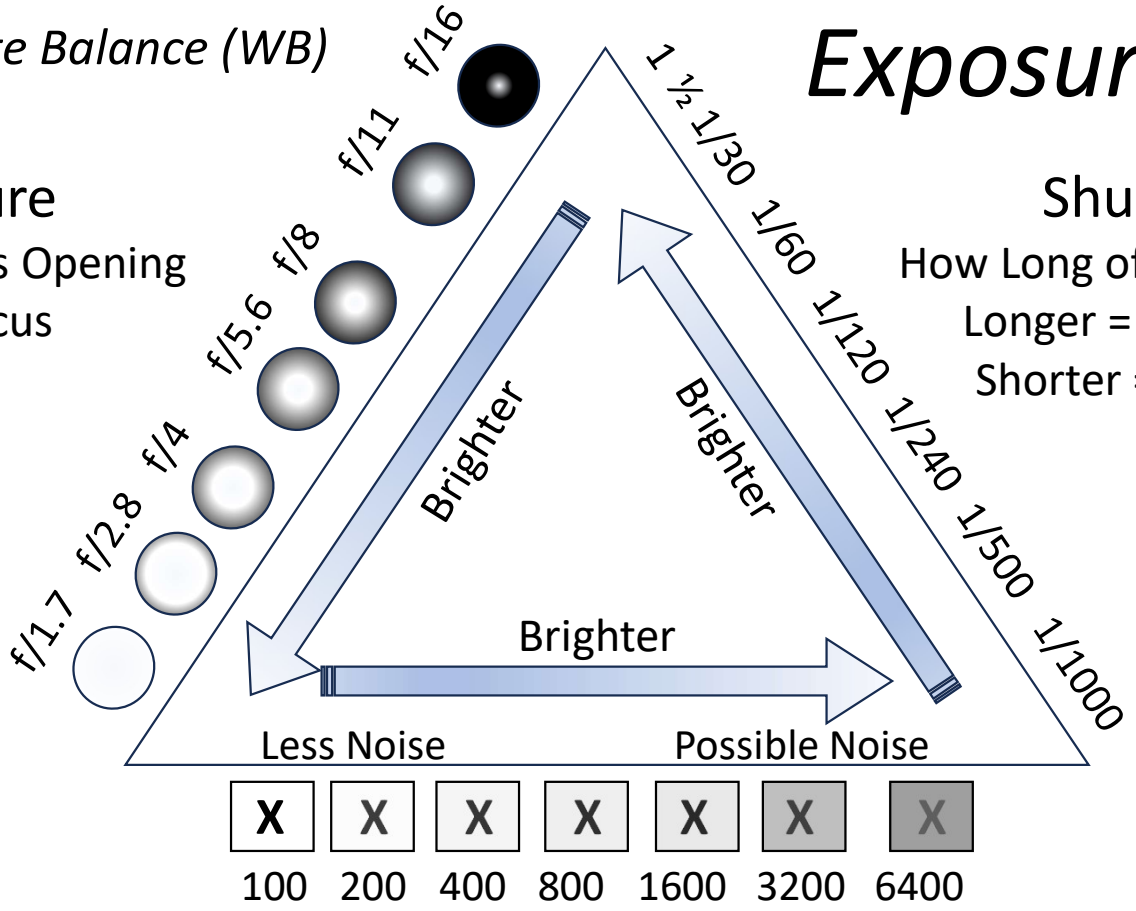
Exposure Triangle

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



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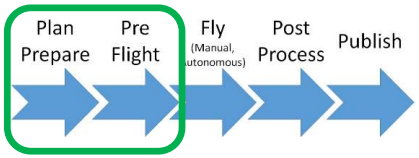
Drone Aerial Photography & Videography

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

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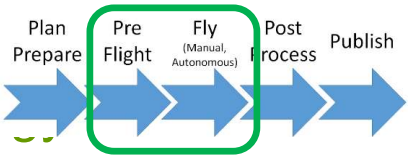
Drone Aerial Photography & Videography

Flying Smart, Flying Safe – Sampling of Some Tools and Technolo



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*

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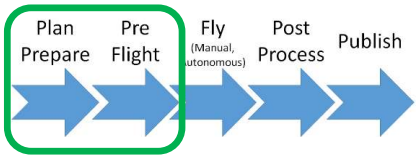
Drone Aerial Photogrammetry

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)

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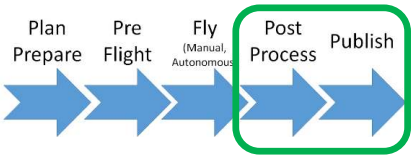
Drone Aerial Photography & Videography

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 (Preimeie & 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

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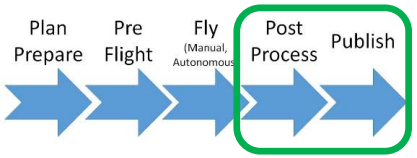
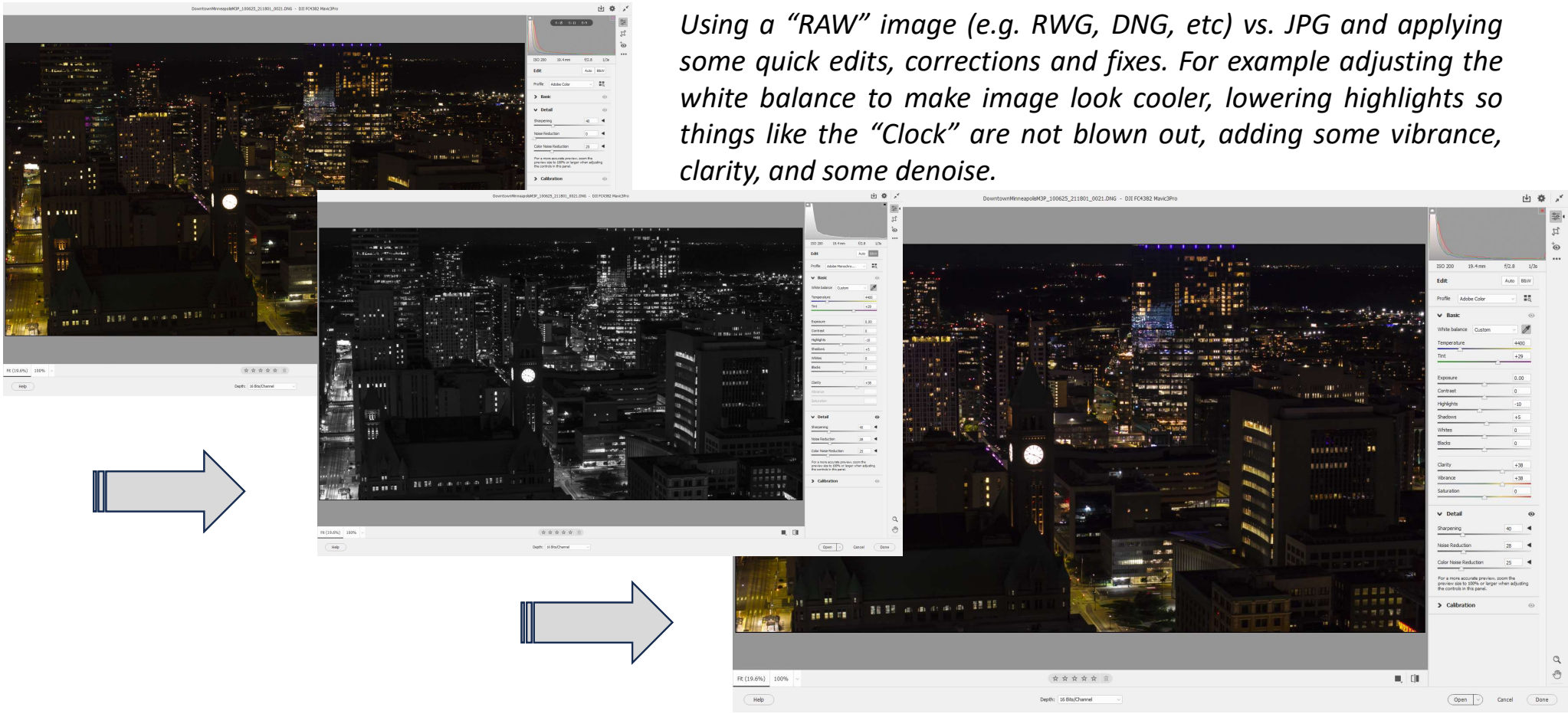
Drone Aerial Photography & Videography

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.



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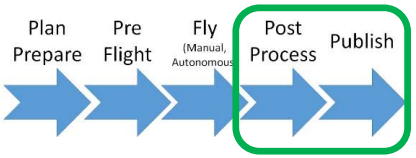
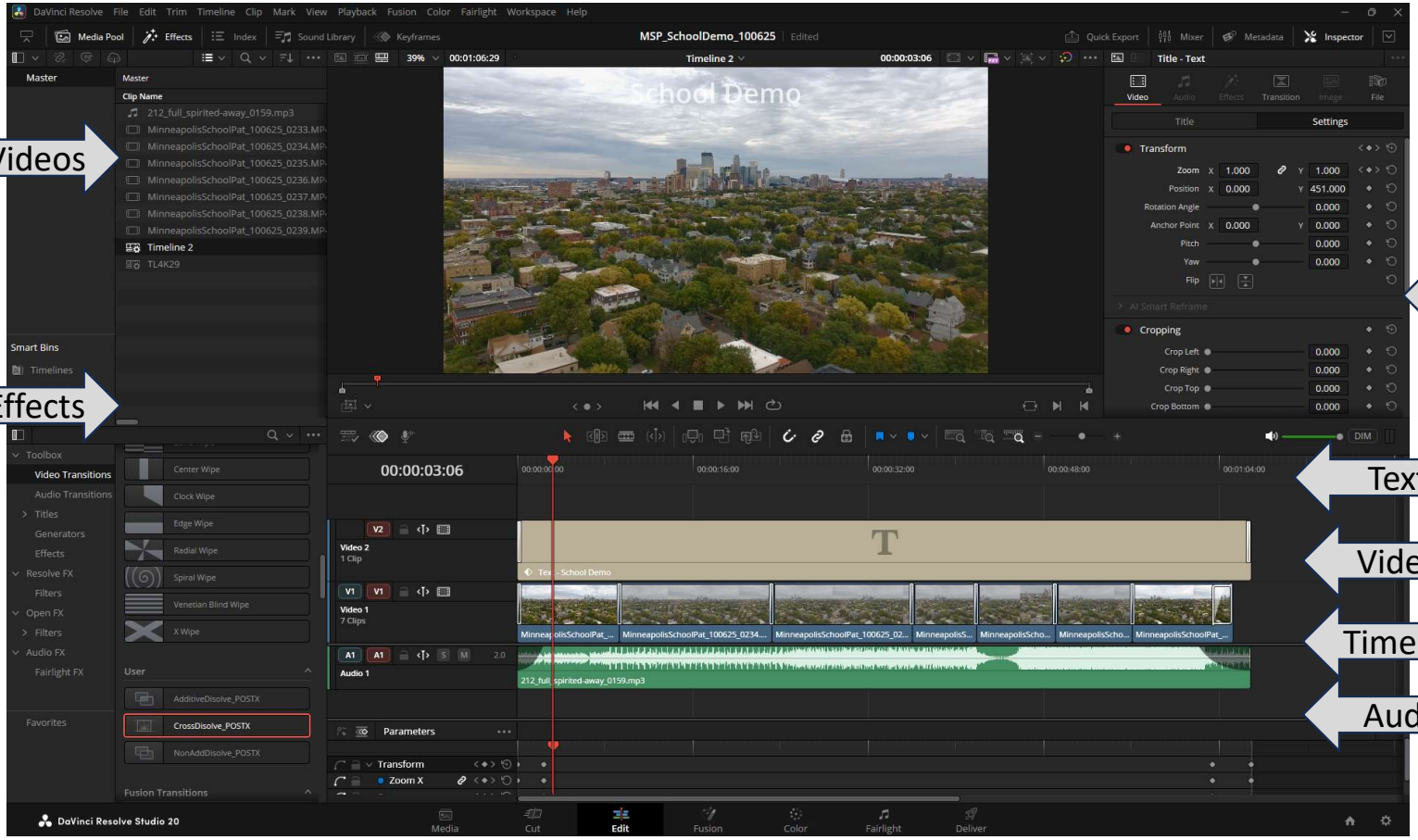
Drone Aerial Photography & Videography

Flying Smart, Flying Safe – Example Video Editing





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

And audio along with various effects.

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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 & 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
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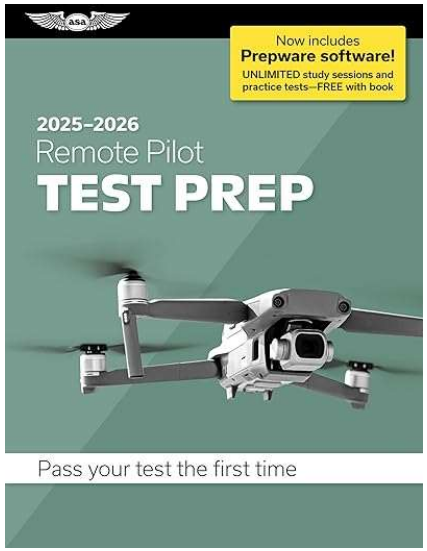
Drone Aerial Photography & Videography

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)
- ✓ 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

PICTURES OVER STILLWATER

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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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