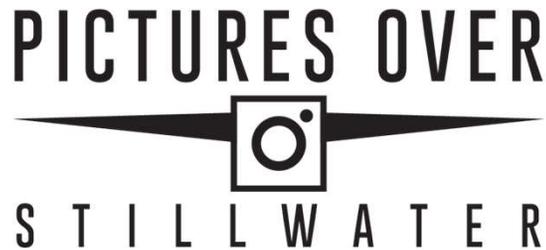# Santa, Please Send Me a Drone For Christmas

By Greg Schulz – Pictures Over Stillwater

FAA Part 107 & MnDoT Aeronautics Licensed Commercial Drone Operator

Professional Photographer, Videographer and FPV - MN FAASTeam Lead Rep DronePro

PicturesOverStillwater.com/links | facebook.com/PicturesOverStillwater

vimeo.com/picturesoverstillwater | twitter.com/POStillwater | Instagram.com/PicturesOverStillwater

picturesoverstillwater.smugmug | youtube.com/@picturesoverstillwater

Santa, Please Send Me a Drone For Christmas
Flying Smart, Flying Safe – Four Foundational Topic Areas

PICTURES OVER STILLWATER
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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)

Santa, Please Send Me a Drone For Christmas
Santa Practices Flying Smart, Flying Safe

- Santa's Drones are:
  - Registered via <mark>faadronezone-access.faa.gov</mark>
  - Registrations are externally visible with RID
  - Equipment inspected and maintained
  - Have high visibility strobes
  - Are being flown within VLOS

- Santa is a part 107 RPIC
  - He has situational awareness
  - Monitors weather, watches & avoids aircraft
  - He maintains his currency:
    - Every 24 months to stay current
    - Uses free online test at <mark>faasafety.gov</mark>
  - He has various waivers including:
    - Operating Over People (OOP), Operating Over Moving Vehicles (OOMV), flying higher than 400' AGL
    - Flying from an aircraft, flying multiple drones at same time, package delivery across state lines
    - He has various airspace authorizations via LAANC and some with continuing coordination

Santa, Please Send Me a Drone For Christmas
Flying Smart, Flying Safe – Wide World Of Drones – Which is for you?

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- Drones are Un-manned, No on-board crew, Remotely Operated
- Our focus is on aerial drones (e.g. aircraft) aka:
  - Unmanned aerial system (UAS), unmanned aerial vehicle (UAV), small UAS (sUAS)
  - Generally under 100 pounds, more specifically most under 55 pounds
  - Fixed wing including traditional RC planes as well long range, long cruise for mapping
  - Rotor being very popular including (single, dual, quad, octa motor/props)
  - Large number of rotor drones in the sub 250g (.55 lbs) to several pound range
  - Many commercial/first responder rotor drones in the 30+ pound range
  - Larger agriculture/spray/dispersal rotor drones can be even larger
  - Smaller drones can be well under 250g with various features
  - Usually operated via a remote control unit and some type of display
  - Some have built-in cameras with a first person view via a display
  - Some can also carry extra payload such as an additional camera
  - Costs vary from DiY & kit build, turnkey, size, performance, functionality

Image via Jeremy Williams

Santa, Please Send Me a Drone For Christmas
Flying Smart, Flying Safe – Wide World Of Drones – Which is for you?

- There are different types of drones (besides fixed wing & rotor)
  - o Small STEM drones that can be programmed such as Telo and CoDrone EDU/Robolink
  - o Small FPV and racing drones (whoops & tiny whoop) including DIY, kits and turnkey solutions
  - o Small action drones with camera, enclosed props such as DJI (Flip, Neo, Avata), Hoverair & others
  - o Small camera drones that can record photos and videos with various features, functionality
  - o Medium size camera drones with one or more cameras, increased functionality and price
  - o Larger size consumer/prosumer drones with more cameras, functionality and cost
  - o Enterprise class drones with even more functionality, size, performance and cost

- What is the best drone to get?
  - o DiY or kit build, or turnkey? New or Used? On-line or big box store or local drone reseller?
  - o Whats our budget, what features, functionality do you need vs. what you want?
  - o If its your first drone and no experience, then what ever you can afford to crash or lose ;)
  - o Easy to use so you are more inclined to take it out and use it, vs. afraid to use it!
  - o Key point is what are you going to use the drone for, and how or where are you going to use it?

Santa, Please Send Me a Drone For Christmas
Flying Smart, Flying Safe – Wide World Of Drones – Which is for you?

- Various functionality and attributes (besides weight, physical size, type)
  - Endurance or how long the aircraft can fly for, built-in or standard Remote ID (RID)
  - Transmission distance for how far the aircraft can communicate with controller
  - Ability to hover in place with no input to controls based on optical sensor and/or GPS
  - Automatic takeoff and landing, Return To Home (RTH) on low Battey or signal loss
  - Geo-Fencing and limiters (altitude, distance), beginner modes
  - Speed and control stick sensitivity, selectable modes (Slow, Normal, Fast)
  - Obstacle Avoidance (OA) aka what some refer to as AI along with autonomous flights
  - Stabilization via Gimbal of camera view, un-stabilized view (e.g. free form)
  - Various camera or sensors (e.g. RGB, Thermal, Lidar, NDVI, etc) and settings
  - Stabilized control or full manual control for doing flips, rolls, tumbles, racing
  - Some have swapable cameras/gimbals, most are fixed or built-in
  - Camera range from 1K (or less) to 8K and beyond for video
  - Some are general purpose, others targeted for different usage (hobby vs commercial)

Santa, Please Send Me a Drone For Christmas
Flying Smart, Flying Safe – Wide World Of Drones – Which is for you?

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- Where to get a drone (besides from Santa)
  - o Online (Adorama, Amazon, Autel, Best Buy, B & H, DJI, Dronenerds, Ebay, GetFPV, Potensic, RotorRiot, etc)
  - o In person at Big Box stores as well as smaller local or regional hobby stores & resellers
  - o For used there is Ebay and Facebook Marketplace as well as via various communities
  - o Also for used check with someone you know to see if they are looking to sell there's

- What to look for and consider:
  - o Is it new or used, what condition is it in, is it a turnkey solution or DiY kit?
  - o If used, make sure the seller has "unbound" it before you buy it.
  - o What all is included, is it a bundle kit with drone, controller, batteries, spare props, case?
  - o Is it just a drone with or without a controller, e.g. ala carte buy items separately
  - o Does the controller have a built in display or does it require FPV Goggles or a phone app?
  - o Will you be flying via FPV Goggles or with a display in or attached to your controller?
  - o Whats involved in setup and configuration, what app software do you need to download?
  - o Are there training videos to watch before flying or a simulator to practice with?

Santa, Please Send Me a Drone For Christmas
Flying Smart, Flying Safe – Wide World Of Drones – Which is for you?

Examples of various drones & components:

Autel (EVO Max, EVO II, EVO Lite & Nano series), Anzu, Betaflight, Betafpv, Bwine, Caddx, DJI (Flip, Neo, Avata, Mini series, Air series, Mavic & Enterprise series, Inspire & Matrice series), Emax, Fat Shark, Firehouse, Freefly, Holystone, Hoverair, iFlight, Lumenier, Newbeed, Parrot, Potensic ATOM series, Robolink CoDrone EDU, ORQA, Ruko, Skydio, Skyrover, Skyzone, Snaptain, SwellPro (Fishing), Toladrone, Yuneec among many others.

Santa, Please Send Me a Drone For Christmas
Flying Smart, Flying Safe – Wide World Of Drones – Accessories

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Drone stocking stuffers:
- Soft sided carrying case, backpacks, hard carry case
- ASA Part 107 Test Prep kit study guide
- Extra batteries, spare props, portable battery charger
- External strobe lights like those from Firehouse
- UV/Neutral Density (ND) filters and lens protectors
- Landing pads, wrap decals, shoulder strap/lanyards
- High visibility safety vest, cold weather flight gloves
- Bumpers, RTK and audio sound speakers
- Smart controllers with built-in screens
- Apps (UAVforecast, Aloft Aircontrol, UASidekick, Windy, etc)
- Fast MicroSD Cards like SanDisk ExtremePro U3 V30
- USB/USBc to SD/MicroSD adapter/reader
- Drone insurance, Drone School/Education/Lessons
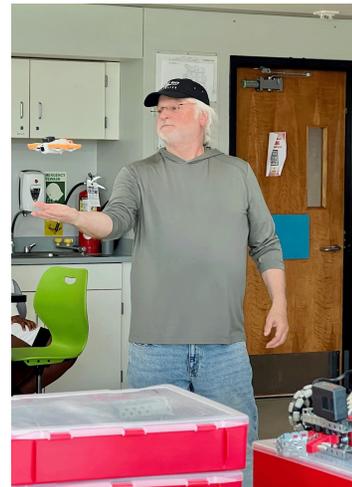
https://www.faa.gov/uas/recreational_fliers/knowledge_test_updates/

Santa, Please Send Me a Drone For Christmas
Flying Smart, Flying Safe – Getting Ready and Using Your Drone

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- Preparing for your (first) flight
  - Licenses/Certifications
    - TRUST (free) hobby/rec aka 44809 flyers
    - Part 107 initial and recurring
    - Free if "current" part 61 at FAAsafety.gov
  - Drone (Aircraft) registration
    - Via faadronezone-access.faa.gov
  - Unboxing and pre-flight preparation
    - Follow manufactures instructions & videos

- Your first (or its been awhile) flight
  - Where and when to fly
    - Are weather conditions safe to fly?
    - Are you in controlled airspace?
      - If so you need an LAANC authorization
    - Are there any TFR, NOTAMs, Drotams?
    - Are there any ground restrictions?

YOUR NEW DRONE

- All drones greater than .55 pounds at takeoff (250 grams) are required to be registered.
- Registrant must be at least 13 years old.
- Registration will cost $5.

- Visit the getting started page for new drone owners.
- Determine what kind of drone flyer you are.

- Download the B4UFLY mobile application.
- Enjoy flying your new drone!

FAA Holiday Drone Video Message

Questions? Contact your local FAA office

WWW.FAA.GOV/UAS

https://www.faa.gov/uas/recreational_fliers/knowledge_test_updates/

Santa, Please Send Me a Drone For Christmas
Flying Smart, Flying Safe – License/Certification & Registration

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Who Are You?

- Regular Pilot (Crewed)
- 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 Mission

Weather Conditions
Day, Night, Wind
Clouds, Visibility

Santa, Please Send Me a Drone For Christmas
Flying Smart, Flying Safe – Big Picture and Background

https://www.faasafety.gov/

faa.gov/uas/recreational_fliers/knowledge_test_updates/

Santa, Please Send Me a Drone For Christmas
Flying Safe, Flying Smart – Some Tips, Tricks and Best Practices

- Flying Indoors vs. Outdoors
  - When Outdoors FAA rules apply and weather can vary as well as be a factor
  - Indoors may have poor or no GPS along with poor lighting (can affect stable flight)
    For example, obstacle avoidance or "AI" might not work in low light conditions
  - 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
    Or, how sensitive are the controls and how aggressive are your inputs
  - 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
  - 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

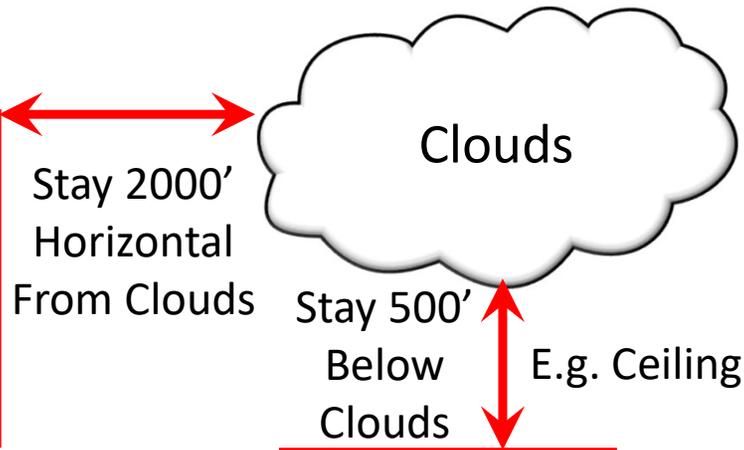# Santa, Please Send Me a Drone For Christmas
## General Reminders – Drone Rules and Regulations

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

Clouds

Stay 2000' Horizontal From Clouds

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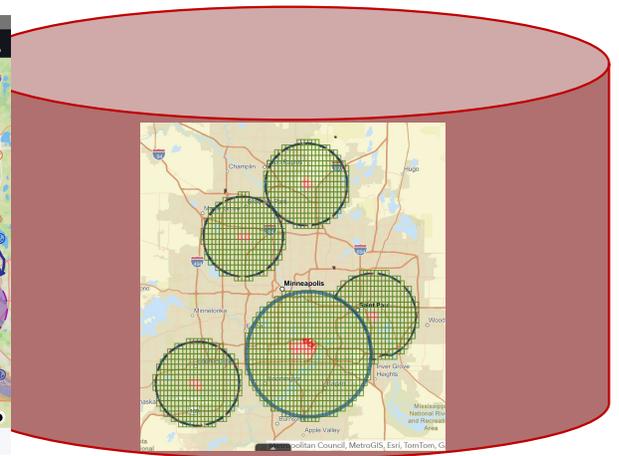
(1) Hobby/Rec limited to 400' AGL in uncontrolled, All Alt in Controlled are absolute unless waiver or special authorization
(2) OOP / OOMV requires waiver and/or special category of aircraft and avoid flying low and reckless

Santa, Please Send Me a Drone For Christmas
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 of your aircraft
5. Keep an eye on your aircraft, watch for other aircraft
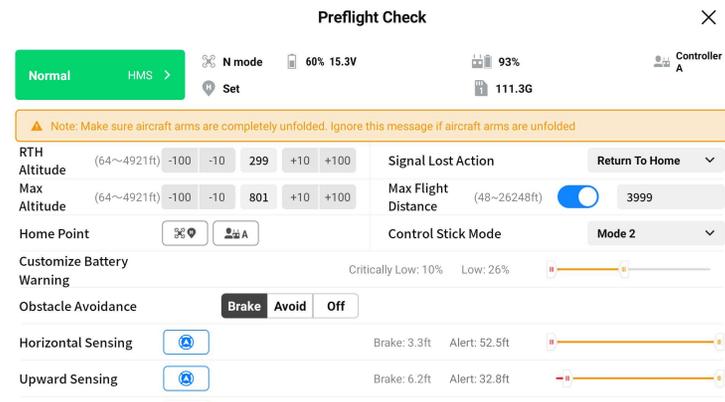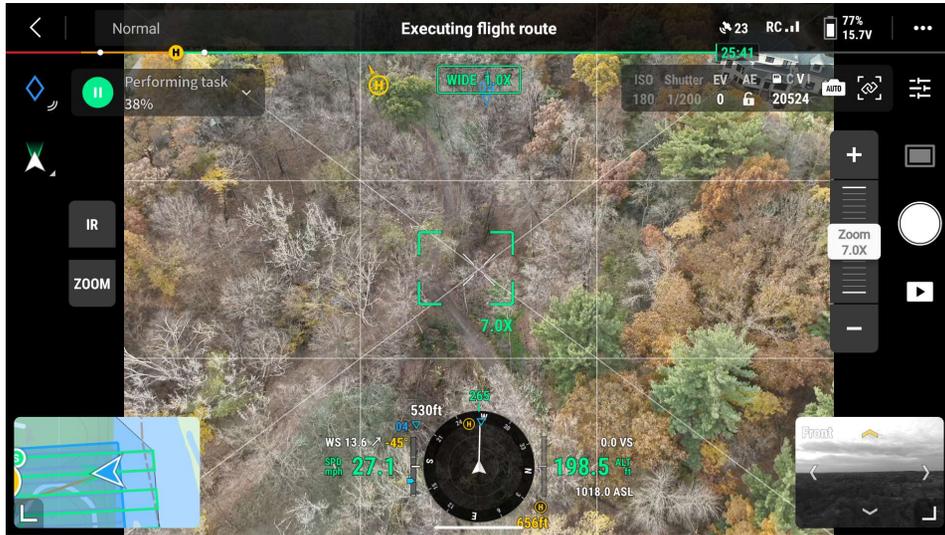6. Watch out for task saturation, use common sense
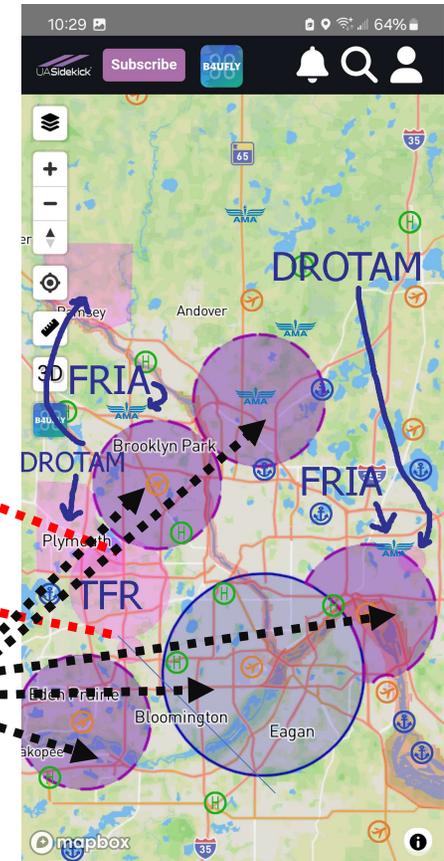
Use Apps such as UAVForecast, B4UFLY, UASidekick, Foreflight, Aloft Aircontrol & others for planning and insight

Controlled Airspace

Santa, Please Send Me a Drone For Christmas
Flying Safe, Flying Smart – Some Flight Control Interface "Dashboards"

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- Displays Vary by Aircraft, Controller, Flight App
- Various Status Indicators and Telemetry
- Situational Awareness, Maps, Locators, Alerts
- Reminder:
  - ✓ Red Indicators Mean STOP or WAIT
  - ✓ Yellow/Orange Mean Caution or Warning
  - ✓ Green usually means good to go

Santa, Please Send Me a Drone For Christmas
Flying Safe, Flying Smart – Some Flight Control Interface "Dashboards"
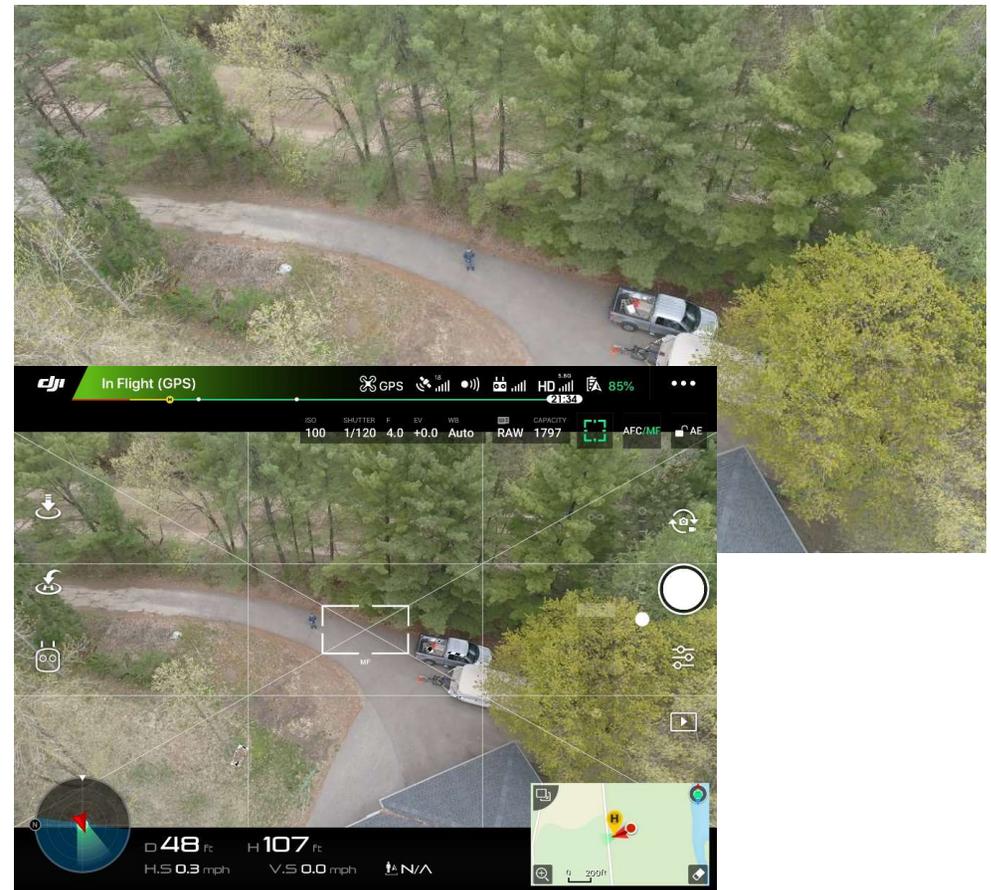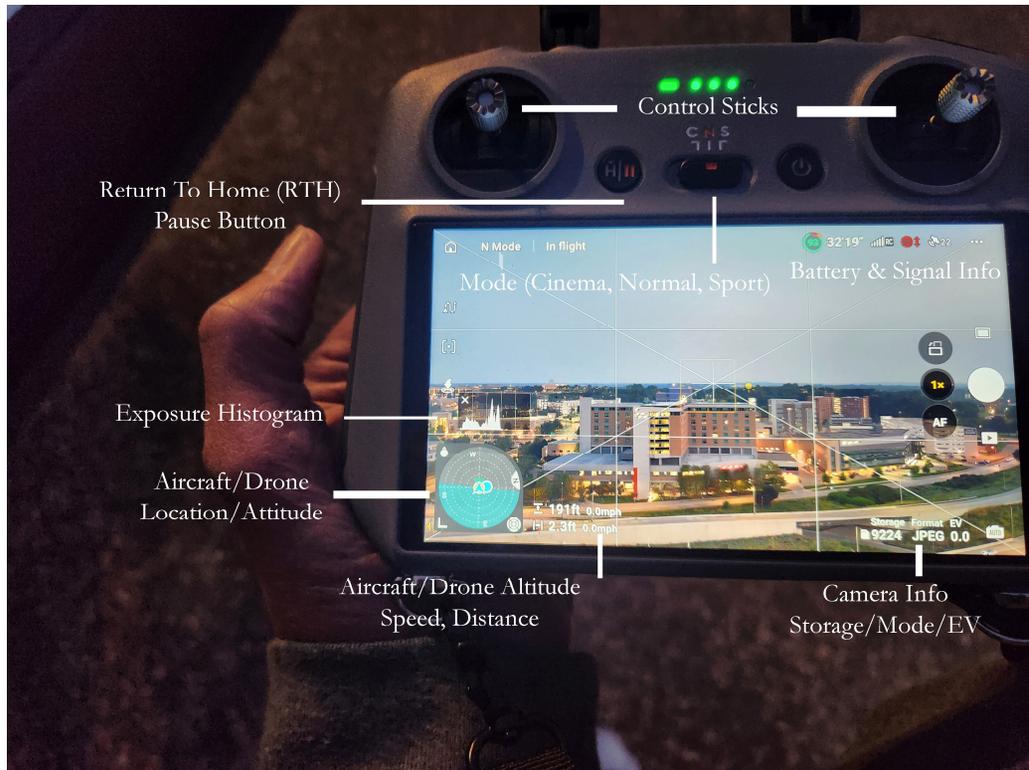
Santa, Please Send Me a Drone For Christmas
Flying Safe, Flying Smart – Tips, Tricks, Recommendations

- How to avoid your aircraft flying away (loss of control)
  - Stay within visual line of sight (VLOS) of aircraft
  - Wait for aircraft (and controller) to indicate its ready for flight:
    - No RED or Orange warning caution messages
    - That satellites have been acquired, home point updated
    - Ambient Light is ok for positioning sensors
    - No signal interface, Compass or IMU calibration issues
    - Antenna on controllers are in upright position with good signal
  - Monitor weather, especially winds
    - Use visual sights, cues (e.g. trees, clouds, flags) along with apps (e.g. UAVforecast & others)
    - Direction, Speed and Gusts, at ground and at altitude
    - Are buildings, structures or trees providing shelter near ground or causing turbulence
  - Monitor your instruments while keeping an eye on aircraft
    - Battery status, remaining flight time, signal strength, watch for signal interference
    - You want to return home flying with the wind, plan your flight route

Santa, Please Send Me a Drone For Christmas
Flying Safe, Flying Smart – Tips, Tricks, Recommendations

- How to stay out of, or off of tree's, power lines, structures, people, vehicles:
  o Wait for warning messages to clear before you take off

  o Look up and around, where are the obstacles, what is the wind doing?

  o Are there any tree's or powerlines above or nearby?

  o Where will the wind try to take your aircraft?

  o After you takeoff, pause, check your flight controls, does aircraft respond?

  o Any warning messages, or does anything look out of place or not right on your display?

  o Land if things don't look right, sometimes its just a quick land, maybe power cycle

  o Stay heads up keep eye on your aircraft and where it is, maintain situational awareness

  o Have a visual observer to help keep an eye on the aircraft as well as obstacles

  o Obstacle Avoidance (OA) aka "AI" can help offload some tasks

  o Will an "RTH" on low battery or signal loss cause aircraft to climb up into a tree?

  o Don't become distracted, avoid staring at your screen

  faa.gov/uas/recreational_fliers/knowledge_test_updates/

Santa, Please Send Me a Drone For Christmas
Flying Safe, Flying Smart – Tips, Tricks, Recommendations

- How to avoid crashing indoors
  - Wait for aircraft (and controller) to indicate its ready for flight:
    - No RED or Orange warning caution messages
    - That satellites have been acquired, home point updated
    - Ambient Light is ok for positioning sensors
    - No signal interface, Compass or IMU calibration issues
    - Antenna on controllers are in upright position with good signal

  - Watch out for obstacles
    - Furniture, light fixtures, paper or items that can get sucked up into the aircraft
    - Trees, plants, people, decorations, people, pets, people, air currents and people

  - Pro-Tip
    - Remove your props when indoors doing initial setup, first time power on, FW updates
    - Also in an well lit area with high ceiling and plenty of room for when aircraft moves around
    - Important: note which prop goes on what motor to avoid aircraft crashing...

Santa, Please Send Me a Drone For Christmas
Flying Safe, Flying Smart – Tips, Tricks, Recommendations

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- Common Trouble Shooting Tips, Tricks and Recommendations
  - Aircraft wont power on:
    - Check that battery properly installed, firmly locked into place and charged
    - Verify proper push button power on sequence (e.g. DJI is Push, Release, Push and Hold for 3 sec)
    - Is controller powered on, if using external phone/tablet is cable attached properly
    - Has the aircraft been paired with the controller?
    - Do the props spin when both control sticks are moved down and inward at same time?
      Note: This is where removing the props can be useful for first timers.
      Note: If props spin to stop press both sticks down and inward at same time
    - Does the aircraft or battery display a "flash code", check instructions for what it means

  - Remote Controller indicates Compass or IMU calibration needed:
    - Pro-Tip, move away from metal and electronic devices during calibration
    - Follow instructions for calibration, wait until calibration is successful

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Santa, Please Send Me a Drone For Christmas
Flying Safe, Flying Smart – Tips, Tricks, Recommendations

- Common Trouble Shooting Tips, Tricks and Recommendations
  - Your remote controller is indicating there is a gimbal motor overload
    - Land immediately, power off aircraft
    - Check that you have not left a gimbal guard on, or left a transit bracket in place

  - Your remote controller indicates weak signal or signal loss
    - Return aircraft to home landing spot
    - Pro-Tip, verify that you have a safe RTH altitude setting enabled, and RTH on signal loss enabled
    - Pro-Tip, this is why you wait until aircraft says home point updated before taking off…

  - The built-in lights on the aircraft are weak or turn off when shooting video:
    - Add additional high visibility strobe lights that can be seen for 3 miles
    - Check your settings to change option to disable lights being turned off during video

  - Birds are circling where you are going to be flying
    - Wait until they clear the area

Santa, Please Send Me a Drone For Christmas
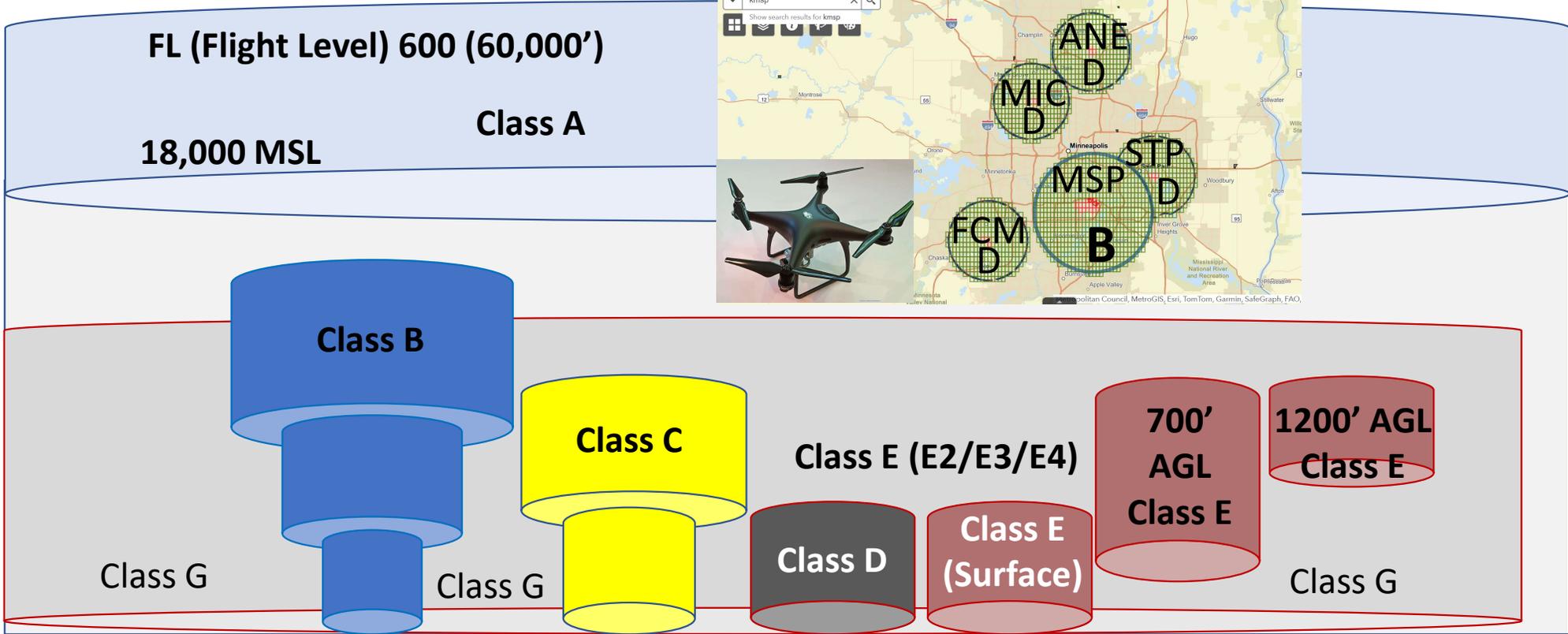## Flying Safe, Flying Smart – Tips, Tricks, Recommendations

- Common Trouble Shooting Tips, Tricks and Recommendations
  - o Your aircraft does a flip (side roll) or tumble (pitch forward or back) when powered up
    - Chances are your props are on backwards or not in the correct position
    - One front motor spins clockwise, one counter clockwise, props are paired to specific motor
    - One rear motor spins counter clockwise, one clockwise, and are opposite of front
    - Make sure props are paired with the proper motor
    - Pro-Tip If props are not attaching easily to a motor chances are it's the wrong pair
  - o Your remote controller and display on your phone keep going on and off
    - Verify that the cables are properly connected and not coming loose
    - Make sure your controller and phone are fully charged, also put your phone into Airplane mode
  - o Your aircraft sounds like a noisy weed Wacker when hovering
    - Land and inspect your props, are their nicks, gouges, chips, dents, pieces missing?
    - Replace the damaged props, if noise persists, try quieter props if available

Santa, Please Send Me a Drone For Christmas
Flying Safe, Flying Smart – Airspace Considerations

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

Class A

18,000 MSL

Visualize it: See FAA UAS Data on a Map — Federal Aviation Administration

kmsp

Show search results for kmsp

ANE D

MIC D

STP D

MSP B

FCM D

Class B

Class C

Class E (E2/E3/E4)

700' AGL Class E

1200' AGL Class E

Class D

Class E (Surface)

Class G

Class G

Class G

https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/media/17_phak_ch15.pdf
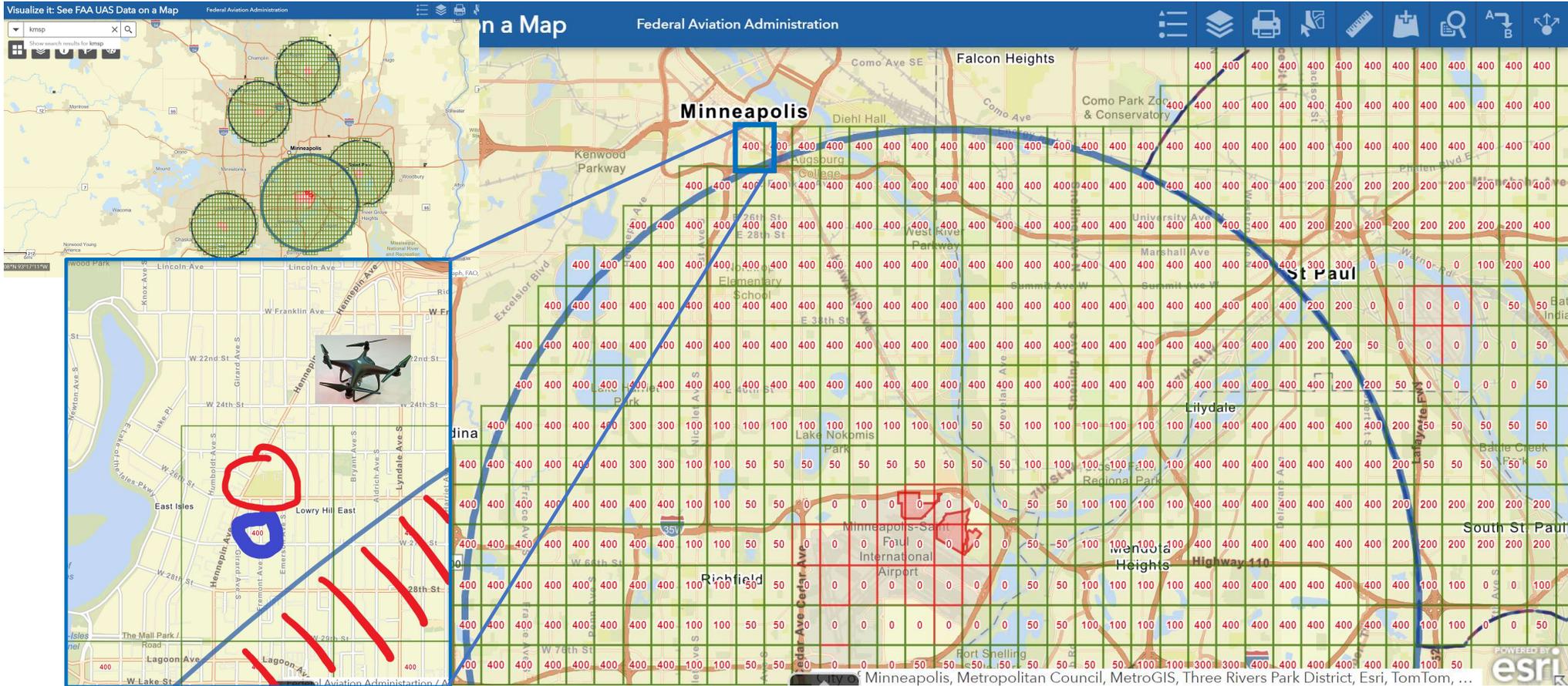
Use Apps such as UAVForecast, B4UFLY, UASidekick, Foreflight, Aloft Aircontrol & others for planning and insight

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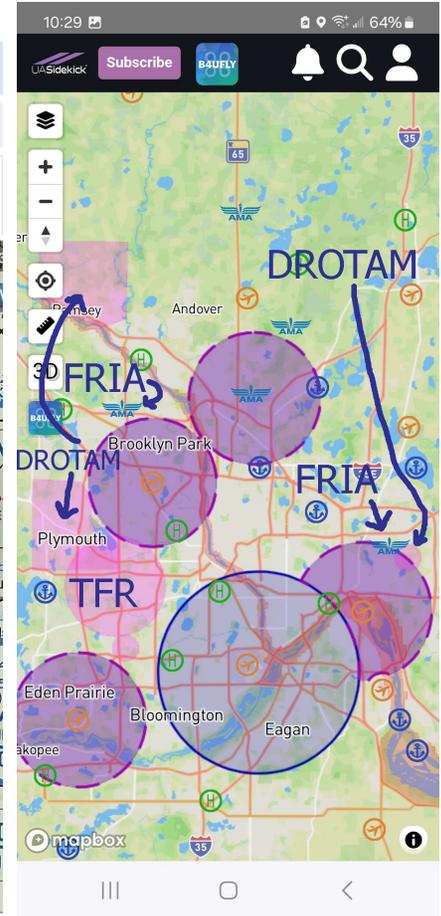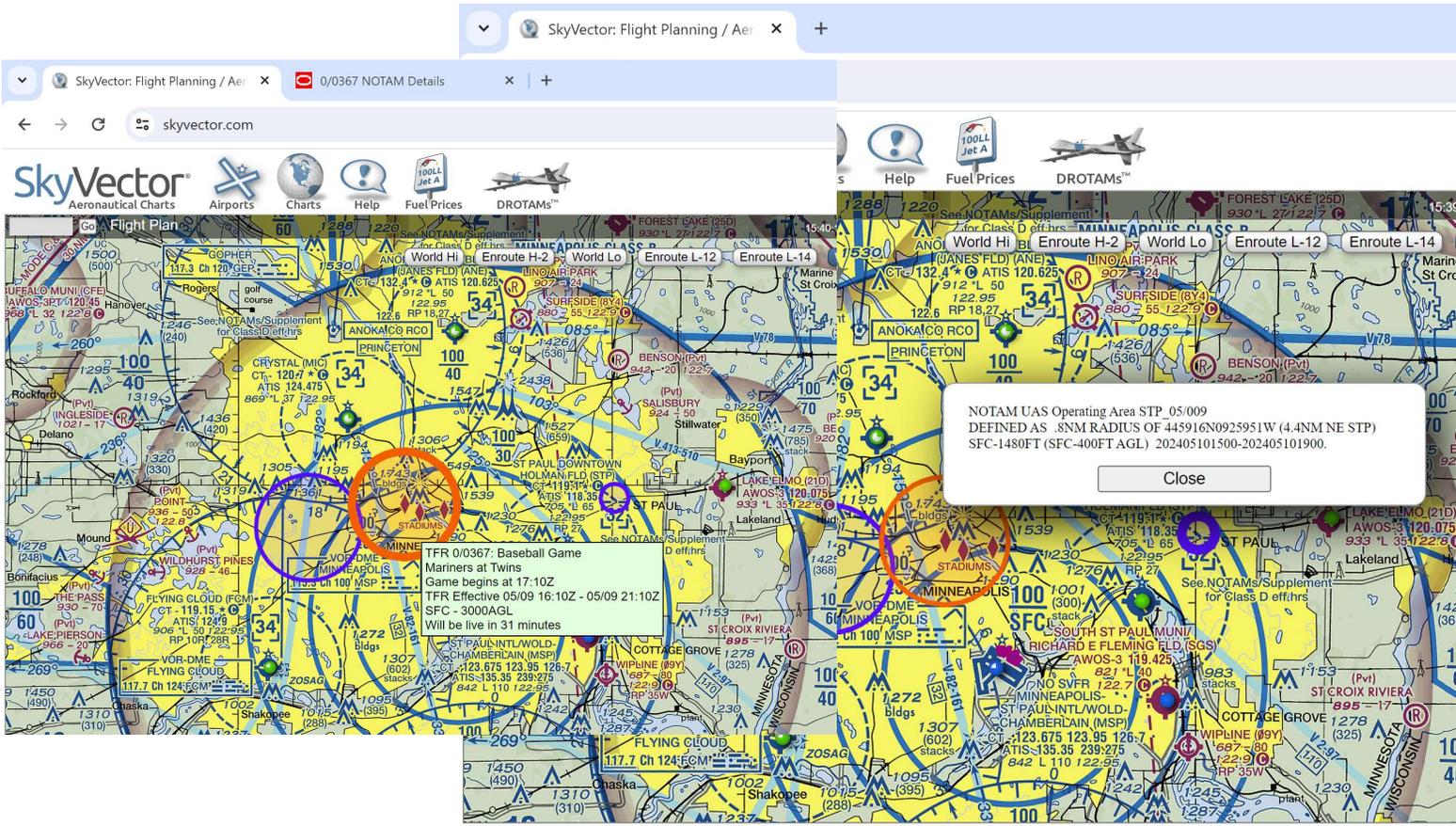## Flying Safe, Flying Smart – Airspace Considerations

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

Santa, Please Send Me a Drone For Christmas
Flying Safe, Flying Smart – Airspace, TFRs, NOTAMs, DROTAM

Via Skyvector and UASidekick

Santa, Please Send Me a Drone For Christmas
Flying Safe, Flying Smart – Some Additional Tools and Resources

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),*
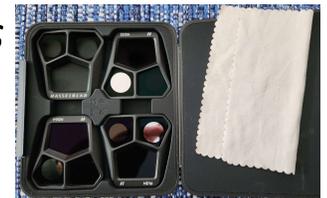
Mission Planning and Flight Apps

- *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 Accessories

- *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, Gimbal Covers*

faa.gov/uas/recreational_fliers/knowledge_test_updates/

Santa, Please Send Me a Drone For Christmas
Flying Safe, Flying Smart – Cold Weather Flying

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

Karen

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

Santa, Please Send Me a Drone For Christmas
Flying Safe, Flying Smart – Cold Weather Flying

When Was The Last Time You Used Your Equipment?

Is Your Equipment, HW, SW, Settings, Aircraft, Tools Ready To Fly?

Have you flown with gloves before, or lately?

Are you dressed appropriately, is your aircraft ready for the cold?

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

Gloves (Flip Fingers, Touch Pad Sensitive)

Stylus Touch Pen

Extra Batteries

Pocket Heater

Santa, Please Send Me a Drone For Christmas
Flying Safe, Flying Smart – Some Aerial Photography Examples

PICTURES OVER STILLWATER
PicturesOverStillwater.com

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Santa, Please Send Me a Drone For Christmas
Flying Safe, Flying Smart – Your First Drone – Via FAASTeam

- All drones greater than .55 pounds at takeoff (250 grams) are required to be registered.
- Registrant must be at least 13 years old.
- Registration will cost $5.

- Visit the getting started page for new drone owners.
- Determine what kind of drone flyer you are.

- Download the B4UFLY mobile application.
- Enjoy flying your new drone!

FAA Holiday Drone Video Message

Questions?
Contact your local FAA office

WWW.FAA.GOV/UAS

Santa, Please Send Me a Drone For Christmas
Flying Safe, Flying Smart – Some Additional Links and Resources

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Some Drone Sites and Resources

- Federal Aviation Administration (FAA) Drone sites Faa.gov/uas & faasafety.gov
- Drone registration for Hobby (> .55lbs) and part 107 (anything under 55 lbs) https://faadronezone.faa.gov/#/ (Watch out for fake or over priced sites)
- Rec/hobby 44809 TRUST test (online, its free, follow the links) https://www.faa.gov/uas/recreational_fliers/knowledge_test_updates/
- B4UFLY (FAA Free App, Info, LAANC authorizations) - faa.gov/uas/getting_started/b4ufly
- DJI Virtual Flight Simulator (Free) - dji.com/downloads/djiapp/dji-virtual-flight
- MnDoT Aviation (Commercial Drone License & Registration dot.state.mn.us/aero/drones
- Facebook: The Mighty Drones – FPV Drone Racing facebook.com/groups/themightydrones
- Facebook: MN sUAS facebook.com/groups/1860070477555048
- Pictures Over Stillwater https://PicturesOverStillwater.com/links facebook.com/PicturesOverStillwater Instagram.com/PicturesOverStillwater

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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

Santa, Please Send Me a Drone For Christmas

Thank You

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