Southwestern University

Quadcopter

(DRONE)

Rules for Use

Quadcopter/drone rules for use established: March 8, 2016.

All departmental drone operators must register quadcopter/drone with the FAA. Operators must keep a current up to date FAA registration card in quadcopter case and present when flying.

At this time, drones used for academic, educational or research have been classified as recreational and will not require a section 333 exemption.

FAA safety rules to follow:

• Fly below 400 feet	• Never fly over stadiums, sports events or groups of people
• Never fly near other aircraft	• Never fly under the influence of drugs or alcohol
• Keep Unmanned Aircraft System (UAS) within visual line of sight	• Never fly within 5 miles of an airport without first contacting the air traffic control and airport authorities
• Keep away from emergency responders	

Guidelines to follow:

- Drone operator must demonstrate operator can safely setup and fly their drone with proficiency prior to operating for departmental/academic uses. Upon review of owner's manual and video tutorials, drone operator will train hands-on at the east campus athletic fields when no individuals are present. When proficiency is accomplished, operator will schedule a formal proficiency demonstration with the Safety & Risk Management Office. Operator will receive a copy of a drone proficiency certificate and policy acknowledgement form at the successful completion of this on site flight test.
- A minimum of two people will be required to operate the quadcopter, one person to fly the quadcopter and one person to act as an observer and keep track of flight time and battery life.
- No indoor flights are permitted
- Do not fly over 400 feet in altitude. (Federal law)
- Never fly within 5 miles of an airport without first contacting the air traffic control and airport authorities (Federal law)
    - Southwestern University campus is 2.8 nautical miles from the Georgetown Municipal Airport.
    - Call Georgetown Municipal Airport, air traffic controller [512-868-3580] to notify that you plan to fly drone at a specific time and location. They will provide confirmation that flight is acceptable.
- Always keep quadcopter in visual range. (Federal law)
- Do not fly over crowds.
- Do not fly near or over large sporting events. (Federal law)
- Do not fly in unsafe wind conditions (> 15 mph).
- Take off from a clean surface to avoid getting sand and dirt in the motors
- Treat the air over private property as private property (respect privacy).
- Get written permission before flying on private property.

- Do not fly near power lines and radio towers. (RF frequencies from these sources can interfere with controlling quadcopter)
- Use of the quadcopter at any organized event must have written permission of the event coordinator.
- Understand safe handling of the lithium-ion polymer (LiPo) batteries used in the quadcopter. Special attention is needed to safely charge, store and transport these batteries.
- Observe all city, county and state regulations on the operation of radio-controlled aircraft.
- Do not fly quadcopter in an area with posted signs forbidding the use of radio controlled aircraft.
- Quadcopter will not be permitted to be flown at stadiums, games, sporting events or events with groups of people. (Federal Law)

Lithium-Ion Polymer (LiPo) Battery Safety

Lithium-Ion Polymer batteries are volatile. Failure to read and follow the below instructions may result in fire, personal injury and damage to property if charged or used improperly.

Never charge batteries unattended. When charging LiPo batteries you should always remain in constant observation to monitor the charging process and react to potential problems that may occur. Use metal storage box as a platform to charge batteries. As an extra precaution, put batteries in charging bags when charging. Do not charge batteries on any flammable surface (wood, cloth etc.).

Never use batteries that have visible damage to the casing or broken / frayed wires.

If at any time you witness a battery starting to balloon or swell up, discontinue charging process immediately. Disconnect the battery and observe it in a safe place for approximately 15 minutes. Continuing to charge a battery that has begun to swell will result in fire. Likewise, never use a battery if you find it swollen or ballooned upon purchase.

Since delayed chemical reaction can occur, it is best to observe the battery as a safety precaution. Battery observation should occur in a safe area outside of any building or vehicle and away from any combustible material.

Wire lead shorts can cause fire! If you accidentally short the wires, the battery must be placed in a safe area for observation for approximately 15 minutes. Additionally, if a short occurs and contact is made with metal (such as rings on your hand), severe injuries may occur due to the conductibility of electric current.

A battery can still ignite even after 10 minutes.

In the event of a crash, you must remove battery for observation and place in a safe open area away from any combustible material for approximately 15 minutes.

Make a visual inspection of the pack. Look for any damaged leads, connectors,

broken shrink, swelling of cells, or other irregularities. Do not use if you find any of the above issues with your pack.

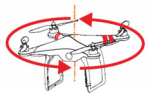
Store battery at room temperature between 40 and 80 degrees F for best results. Never store or leave batteries in a hot car. Do not expose battery pack to direct sunlight (heat) for extended periods. Storing battery in excessive heat for extended periods may cause damage to battery and a possible fire.

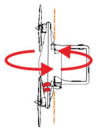
Keep batteries in metal storage box to help contain a fire if one occurs.

Allow batteries to cool before recharging.

Once a battery is charged, place a small piece of tape (with charging date written on it) on battery to indicate it is charged and ready to use. After battery has been used, remove the tape to indicate it needs to be recharged.

GPS & Compass Calibration – follow operating manual and instructions.


Horizontal Rotation


Vertically Rotation

Wind Issues

Wind is a problem. Do not fly quadcopter in high or gusty wind. (> 15mph)
Wind speeds will likely be higher once you are above buildings or trees.

Wind Speed	
Miles Per Hour =	Feet Per Second
1	1.46
2	2.93
3	4.4
4	5.86
5	7.33
6	8.8
7	10.26
8	11.73
9	13.2
10	15.66

Video Tutorials

First time flyer
https://www.youtube.com/watch?v=UxtOMsIsezo

Fail safe return home
https://www.youtube.com/watch?v=ZMEfQ_Vqi4k

Drone Calibration
https://www.youtube.com/watch?v=t2hfclQAjcM

FLIGHT CHECKLIST

Preflight:

Location:_____ Date:_____

__ Contact Georgetown Municipal Airport air traffic controller (with specific flight location and time of flight) for authorization: 512-868-3580

__ Send flight plan summary and notification two days in advance to the Director of Campus Safety and Risk Management at delancem@southwestern.edu

__ All batteries are charged and checked that they are in not damaged or swollen.

__ Select a safe and level area for takeoff and landing of the quadcopter , no sand or loose dirt to clog motors

__ Plan your flight path before liftoff. __ Turn on transmitter

__ Plug in battery and secure it. Be sure battery door clicks shut.

__ Calibrate compass __ Wait for green flashing light

__ Turn motors on. Wait 30 seconds __ Lift off

Landing:

__ Land quadcopter gently

__ Unplug the quadcopter battery first

__ Turn off transmitter

__ Mark LiPo battery as discharged and allow battery to cool before recharging

Postflight:

__ Report any accidents to the Director of Campus Safety and Risk Management at delancem@southwestern.edu; the report should include time and location, operator information, and description of incident to include damages.

Recordkeeping: departmental drone file

Departmental Drone (UAS) Flight Logbook

Date	Flight Location	Times	Comments

Recordkeeping: departmental drone file

DRONE OPERATOR ACKNOWLEDGEMENT FORM

I acknowledge that I have read and understand the components of Southwestern's Quadcopter/Drone Rules of Use policy document. I agree to follow the rules of use and safely operate the drone using prudent judgement. In particular, I will follow battery safety procedures. I have reviewed the specific drone model operator's manual and have reviewed the video tutorials referenced in the rules of use policy document. I have practiced hands-on drone operator/flight proficiency and am ready to demonstrate my abilities to be authorized for general use flights.

_____
Printed Name

_____
Date

_____
Signature

DRONE FLIGHT OPERATOR PROFICIENCY DEMONSTRATION

Designated departmental drone operator: _____ with _____ department has successfully demonstrated proficiency in the setup and flight operation of their drone. A flight plan was provided on site to drone operator and successfully executed. Two take off flights and landing back to base were completed with proficiency.

_____ Authorized
_____ Not authorized at this time. Additional practice and proficiency skills to be developed. Retest.

_____ _____
Director of Campus Safety & Risk Management Date

Recordkeeping – file with Safety & Risk Management Office
Copy: Departmental drone file.

FAA registration for Athletics:	# FA39T4TLLY	(1/13/16 – 1/12/19)
FAA registration for GIS-Digital Fellows:	#FA3F9AMKRY	(11/18/2016 - 11/18/2019)