



FPV Freedom Coalition Safety Guidelines for Recreational Unmanned Aircraft

The FPV Freedom Coalition Safety Guidelines are divided into two sections:

- **Statute:** This means the law and to fly a UAS, you must adhere to these rules. In this document, when you read a reference to 44809, this is the Exception for Recreational Flight which is the law that allows us to fly sUAS as Recreational Operators (hobbyists). The FPVFC explicitly accepts all provisions of 44809 as requirements and stipulates in these FPVFC Safety Guidelines that Recreational Operators who have selected to follow the FPVFC Safety Guidelines, must follow these rules. Failure to follow these rules may result in enforcement action including fines by the FAA.
- **Guidelines:** The US Congress created a gray area by stipulating that Recreational Operators must follow a Community Based Organization's Safety Guidelines. The safety guidelines Community Based Organizations should adopt in their own CBO Safety Guidelines are detailed in the FAA's Advisory Circular, 91-57C, Exception for Limited Recreational Operations of Unmanned Aircraft. Because the Advisory is not law, section 1.1.1 of this Advisory Circular states, "The content of this document does not have the force and effect of law and are not meant to bind the public in any way, and the document is intended only to provide information to the public regarding existing requirements under the law or agency policy." For This reason, the FPVFC has divided its Safety Guidelines into Statutes and Guidelines. The Statute reflects the rule of law or agency regulations, and the Guidelines reflect the recommendations of FPVC to further safe flight of sUAS Recreational Operators.



I want to fly under Recreational rules, what is the definition of a Recreational Unmanned Aircraft operator?

As cited in the Advisory Circular, 91-57C in section 2.1, “Recreational Flyer. For the purposes of this AC, a recreational flyer is a person who operates a UA strictly for recreational purposes in accordance with 49 U.S.C. § 44809. This is an operation-specific determination. Recreational operations that do not comply with the statutory parameters are not eligible for the recreational flyer exception of 49 U.S.C. § 44809.”

In AC91-57C, section 2.2.1, the FAA goes on to define recreational purposes as:

“Recreational purposes may not include activities such as flights for any compensation, monetary or otherwise, and flights related to or in furtherance of a business. A person may not combine recreational and commercial purposes in a single flight.”

The FAA also reminds us that a set of Safety Guidelines must be adhered to for all recreational UA flights. This is clarified in the note below 2.2.2.2 of AC91-57C:

“Note: This AC references various types of operations or events that may typically be considered recreational; however, whether or not an operation is considered recreational is situation specific. Each individual pilot must maintain responsibility for compliance with the 49 U.S.C. § 44809(a)(1) requirement for recreational purpose, regardless of whether the event is sanctioned by a CBO or otherwise presented as generally compliant with 49 U.S.C. § 44809(a)(1).”

Statute: The law regarding recreational UA flight:

Registration Requirements:

Any recreational operator of an [FPV](#) aircraft between .55 pounds (250 grams) and 55 pounds (25 kilograms) must be registered with the [FAA](#) per the [FAA sUAS](#) Registration, and the registration number must be present on the outside of your aircraft. You can register at <https://faadronezone.faa.gov/>.

Visual Line of Site (VLOS) Requirements:

As stated in Section 44809(a)(3). “The aircraft is flown within the visual line of sight of the person operating the aircraft or a visual observer co-located and in direct communication with the



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operator.” As described above, this is Statute and is not optional. The FPVFC endorses this rule and requires individuals using these FPVFC Safety Guidelines to follow this rule.

VLOS Clarification: To be operating within visual line of sight (VLOS), either the operator or a visual observer (VO) must be able to see the UA (with vision unaided by any device other than corrective lenses) throughout the entire flight to ensure it does not present a collision hazard to other manned aircraft or persons or property on the ground. The use of a VO is optional, but a VO enables the recreational flyer to look away from the UA for extended periods. The use of a VO is necessary if the recreational flyer wants to use first person view (FPV) devices.

AC 91-57C describes how an FPV camera limits an operator’s situational awareness. The FPVFC supports the requirement of a Visual Observer. We have also gained agreement in the submitted and accepted BVLOS Aviation Rulemaking Committee final report that FPV IMPROVES situational awareness. Our FPV video is now evolving to HD graphics and our UA’s can pivot around any axis at a rate faster than several full revolutions in one second. That is far better situational awareness than flying in a Cessna 172 and trying to see anything at 4:00 o’clock and above the Cessna as the wing completely blocks visual detection. This said, BVLOS is not permitted for any Recreational operations. BVLOS is only permitted with a waiver which also requires the pilot to hold a part 107 remote UAS certificate.

Right of Way:

All Unmanned Aircraft must yield to any full-scale aircraft. The FPVFC has participated in debates on this subject and the FAA Beyond Visual Line of Sight Aviation Rulemaking Committee recommendations including situations where a crewed aircraft yield right of way to a sUAS. This recommendation brought strong and swift opposition from three crewed aircraft associations to Congress. We mention this here to reinforce that FPVFC endorses this rule (which is Statute) and agree that in all cases, sUAS must yield right of way to crewed aircraft.

Authorization for Operations in Controlled Airspace:

As discussed above, this document includes references to Section 44809, which is Statute and therefore the law. This document then cites the FAA Advisory Circular 91-57C¹ which includes the FAA’s guidance and explanation of the recreational rule. The sections below start with a description of either Statute 44809 or the Advisory Circular.

Section 44809(a)(5) reads, “In Class B, Class C, or Class D airspace or within the lateral boundaries of the surface area of Class E airspace designated for an airport, the operator obtains

¹ FAA Advisory Circular Exception for Limited Recreational Operations of Unmanned Aircraft, AC No: 91-57C, Date: 10/20/2022.



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prior authorization from the Administrator or designee before operating and complies with all airspace restrictions and prohibitions.” As described above, this is Statute and is not optional. The FPVFC endorses this rule and requires individuals using these FPVFC Safety Guidelines to follow this rule.

AC 91-57C further clarifies operations in controlled airspace with these sections:

2.2.5.1 The NAS includes both controlled and uncontrolled airspace. Recreational flyers must obtain specific airspace authorization from the FAA prior to operating UA in Class B, C, or D airspace or within the lateral boundaries of the surface area of Class E airspace designated for an airport (controlled airspace). Recreational flyers do not need to obtain authorization prior to operating in Class G (uncontrolled airspace) below 400 feet above ground level (AGL).

2.2.5.2 Recreational flyers may use the FAA’s Low Altitude Authorization and Notification Capability (LAANC) to check for airspace restrictions and obtain authorization to fly in controlled airspace. LAANC provides automated, near real-time authorization for airspace authorization requests in most controlled airspace. See subparagraph 2.2.5.3 below for instances in which LAANC does not provide authorization. Recreational flyers can access LAANC through FAA-approved third-party UAS Service Suppliers (USS). A list of companies approved to offer LAANC services, as well as additional information on LAANC is available on the FAA website at https://www.faa.gov/uas/programs_partnerships/data_exchange/. Recreational flyers may submit authorization requests up to 90 days prior to intended flight.

Note: Recreational flyers should not contact air traffic control (ATC) facilities to obtain airspace authorizations to fly in controlled airspace.

2.2.5.3 If a recreational flyer wants to fly near an airport in Class B, C, or D airspace or within the lateral boundaries of the surface area of Class E airspace designated for an airport that are not serviced by LAANC, the recreational flyer should use the FAA DroneZone website (<https://faadronezone.faa.gov/>) to request an airspace authorization. The recreational flyer should submit the request at least 90 days prior to the proposed flight to allow the FAA time to review the airspace and the information provided for the flight.

2.2.5.4 The FAA recommends that recreational flyers refer to the FAA’s interactive map on the UAS Data Delivery System at <https://udds-faa.opendata.arcgis.com/> to access information and graphical depictions regarding any UAS-specific flight restrictions. On the map, semi-transparent polygons depict airspace information. UAS flight restrictions are shown as red polygons. Recreational flyers are also responsible for complying with all special use airspace designations, including prohibited areas and restricted areas, as well as other special flight rules and TFRs published at <http://tfr.faa.gov/tfr2/list.html>, and Aeronautical Navigation Products (Charts) at https://www.faa.gov/air_traffic/flight_info/aeronav/productcatalog/.



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2.2.5.5 The B4UFLY app is a useful resource for recreational flyers to use prior to operating their UA (whether in controlled or uncontrolled airspace). It provides critical airspace information to the user including the locations of airports, national parks, stadiums, special use airspace (including restricted and prohibited airspace), TFRs, other special flight rules, and more. More information on B4UFLY is provided at https://www.faa.gov/uas/recreational_fliers/where_can_i_fly/b4ufly/.

2.2.6 Section 44809(a)(6). “In Class G airspace, the aircraft is flown from the surface to not more than 400 feet above ground level and complies with all airspace restrictions and prohibitions.”

2.2.6.1 “Ground level” begins at the Earth’s surface and does not include man-made structures, trees, or any obstacle. For example, a UA engaged in recreational operations under 49 U.S.C. § 44809(a) may not be launched from a 10-story rooftop and fly up an additional 400 feet.

The Recreational UAS Safety Test (TRUST) requirement

Section 44809(a)(7) reads, “The operator has passed an aeronautical knowledge and safety test . . . and maintains proof of test passage to be made available to the Administrator or law enforcement upon request.” This clearly states Recreational operators must take TRUST and carry proof of passing this test. FPV Freedom Coalition requires recreational operators citing these safety guidelines to take TRUST and carry proof of passing the exam during flight outdoors.

In addition, Advisory Circular 91-57C provides additional detail with respect to TRUST as follows:

“2.2.7.1 A list of FAA-approved test administrators for The Recreational UAS Safety Test (TRUST) is provided at https://www.faa.gov/uas/recreational_fliers/knowledge_test_updates/.

2.2.7.2 The proof of test passage may be in any format (e.g., paper or electronic) so long as it is readily accessible, legible, and can be presented to the Administrator or law enforcement upon request.”

The FPV Freedom Coalition endorses Pilot Institute as an excellent organization who hosts TRUST. <https://trust.pilotinstitute.com/>



Safety Guideline Recommendations:

Flight Preparation:

- Before flight the operator must review and adhere to any Temporary Flight Restrictions ([TFR](#)) and Notices to Air Missions ([NOTAM](#)) and adjust planned area of operation accordingly.
- When a flight is planned to take place outside of [Class G airspace](#), the operator must submit a request for authorization prior to the operation. As of July 23, 2019, recreational flights can gain authorization to fly in controlled airspace by using [apps that work with the LAANC system](#).
- Before flight, a complete inspection of the First Person View ([FPV](#)) aircraft should be conducted to ensure that each part is operating properly. For example, here is a checklist we at FPVFC use:
 1. Check all wires including battery, motor, flight controller, VTX, ESC to ensure no wires have been cut and all solder joints are intact.
 2. Check integrity of props and ensure prop nuts are tight.
 3. Check battery strap or straps are in usable condition without tears.
 4. Verify FPV camera is aimed up the angle you want and stays in this position.
 5. Verify motors are secured to frame with a quick wiggle of each motor.
 6. Once the battery is connected and before you arm, verify the VTX power you are outputting and channel you are broadcasting on.
 7. Ensure the battery is fully charged and not “puffed” from over-discharging.
 8. Verify arm / dis-arm switch functions.
 9. Verify failsafe switch is operational.
 10. When flying in a group, ensure that your group coordinates VTX channels and power settings.
 11. Always announce your intention to power up your FPV aircraft.
- Appropriate [failsafe](#) programming of the FPV aircraft must be in place before any flight.
 - Failsafe is the condition where command and control signal is lost between the UAV and Recreational Operator. Failsafe programming is the software on the UAV which responds to this condition. This programming may be activated by a loss of signal or the operator switching into Failsafe mode. Examples of Failsafe programming include Return to Home or Return to Launch or shutting off motors.

Know the area you plan to fly (non-racing):

Even though with Freestyle FPV we do not fly at fixed flying fields, there are good practices we recommend to scout the area you plan to fly. We suggest these practices:

1. Verify the airspace you are flying in and get authorization if not class G.
2. Walk the area you plan to fly with an eye to keeping your sUAS within Visual Line of Sight during the flight.
3. Ensure the Visual Observer knows where you plan to fly.



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4. Look for areas where you may land and retrieve the sUAS in case you damage the aircraft and need to land.
5. Before you fly, look for obstacles and obstructions you may encounter while flying. This would include mentally taking note of locations of buildings, trees, other natural obstructions, and power lines. When looking at obstructions and obstacles, think about your mental plan if you hit an obstruction. Before you fly, think about what you would do if you struck an obstacle and where your aircraft might land.
6. Also, before you fly, look for locations people might enter the property below your flying area. Have your Visual Observer monitor these entrances and have a plan to ensure you do not fly over people if individuals do enter the property, you are flying over.

During Flight:

No [FPV](#) flight operation should take place in an area or manner that disrupts or poses a danger to any of the following:

- a. Emergency response efforts, to include law enforcement actions, fire response actions, or military actions, unless the operator is actively engaged in the operation with proper clearance from the authorities.
- b. Areas where crowds of people not related to the event are gathered, to include sporting, musical, or political events.
- c. Civil infrastructure, to include power, water, and transportation facilities.

Emergencies in the air and the appropriate response:

In AC 91-57C, the FAA characterizes an emergency during the flight of a recreational aircraft as the following:

“An emergency is the actual or impending loss of control of a UA or violation of an operational limitation. The FAA recommends that comprehensive safety guidelines address potential in-flight emergencies involving recreational flying, such as:

1. Sustained loss, weak or intermittent radio signals, control signals experiencing interference, or a UA not responding predictably to control inputs.
2. Loss of power or propulsion.
3. Loss of navigation (GPS) or loss of sight of the UA.
4. Flight instruments losing performance or displaying incorrect information.
5. Unanticipated people or aircraft entering the area of operation.
6. Parts or attachments on the UA becoming loose or breaking off.
7. Electrical arcing, or battery or component fires.
8. Unexpected weather (e.g., high winds, sudden storms, fog).”

Material Loss of signal or propulsion (# 1 & 2)



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Set up a Failsafe or Return to Home or Return to Launch. If your sUAS has a GPS and a Return to Home or Return to Launch feature, you should set the RTH or RTL prior to flight. This would include setting the minimum AGL on the RTH or RTL flight to ensure the sUAS does not fly into an obstruction or structure. If your sUAS does not have an RTH or RTL feature, you should program the sUAS to shut the motors off.

In the event of a material loss of signal or loss of propulsion, the operator should land the aircraft as soon as is practical. In other words, if the operator is flying over water, the operator should fly the aircraft so it may land on shore.

Loss of navigation or losing display of flight information (# 3 & 4)

Most FPV sUAS do not have a GPS today. This may change in the future (e.g. Remote ID modules have GPS and we can expect manufacturers to exploit the existence of GPS). First, if you are losing GPS signal, you should land at a safe location. If you lose sight of the sUAS, the appropriate action will be determined by the situation. If the loss of sight of the aircraft is momentary, changing to Angle mode and increasing altitude may allow you to see the aircraft and ensure line of sight radio transmission. If the loss of sight is prolonged AND you are confident the aircraft is not over people, the safest action is to disarm or turn off the controller (transmitter or Ground Control Station) which will activate the Failsafe and shut the motors off. As RC fliers have been taught for years, it is far safer to crash a sUAS with the motor off.

Unanticipated people or aircraft entering the area of operation (# 5)

As sUAS, we must give way to all manned or crewed aircraft. So, if a crewed aircraft enters your area of operation, fly away from the crewed aircraft as soon as possible. If people enter the area of operation, meaning you are now flying over people, fly to a location in the sky where you are not flying over people and have your visual observer assess the situation. If the people are transiting through your area of operation and you can ensure you will not fly over them, continue. If you cannot, land as soon as is practical.

Parts or attachments of the sUAS become lose or break off (# 6)

If something breaks off your sUAS, land as soon as practical. With a FPV sUAS, there isn't much non-essential equipment so anything breaking off will likely mean the aircraft will crash. If this happens, immediately disarm or shut the transmitter off so Failsafe is engaged, and the motors are shut off.

Electrical arcing or battery or component fire (#7)

It is highly unusual for a sUAS to arc or catch on fire in the air. Normally, the most likely time of a fire is if a FPV sUAS is in a bad crash and the battery remains connected. If the battery is punctured, it will likely catch on fire, and it should be handled as if it will immediately catch fire. Keep a fire extinguisher and/or sand bucket on hand for such an emergency.



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In the highly unlikely event of an in-air fire, the best thing to do is disarm or shut off the transmitter to engage Failsafe.

Unexpected weather (e.g., high winds, sudden storm, fog) (# 8)

We are flying recreationally. In other words, we are doing this for fun. If the weather turns bad and prevents you from maintaining Visual Line of Sight, you must land as soon as practical. If a sudden storm moves into your area of operation, landing soon would be wise if the sudden storm is a thunderstorm, carrying winds which would carry your sUAS away. If fog moves into your area of operation, VLOS will be impacted, and you should land as soon as practical.

All UA [FPV](#) flights require a [visual observer \(spotter\)](#) to be present for the duration of any flight. The purpose of the visual observer is as follows:

- a. To inform the operator of any unexpected person or obstacle (vehicles, animals, civil infrastructure) that has entered or is present in the operation area so that the operator may make the necessary avoidance adjustments.
- b. To inform the operator of any other aircraft in the area, both model and full scale.

Night Operations:

Statute 44809, which is the Exception for Recreational sUAS operations, does not specify any restrictions for night flight. In the Advisory Circular, 91-57C, the FAA strongly recommends CBO's add detailed night flight operations to their Safety Guidelines. This Advisory also recommends anti-collision strobe lights and other lighting indicating orientation and flight path be attached to the sUAS. As an alternative, the FAA specifies no aircraft lighting is required if the ambient light is sufficient to maintain visual line of sight. The FPVFC adopts this alternative to specify safety guidelines for night operations.

Night Operation Requirements: The FPVFC requires Recreational sUAS operators to maintain visual line of sight during night operations. This means the ambient light must be adequate for the pilot in command, the person manipulating the controls, or the Visual Observer to see the aircraft without visual aids (binoculars, etc.).

Precautions for Night Flight: The FPVFC has read through the recommended FAA-H-8083-3C, Airplane Flying Handbook, Chapter 11, Night Operations. While this handbook is written for private pilot instruction in crewed aircraft, it is used in part 107 exams. There are several points made in the handbook which the FPVFC endorses and recommends individuals follow the FPVFC Safety Guidelines understand before flying at night. These include:

1. Distance is difficult to gauge at night and whenever possible, the recreational operator should walk or fly the area of operation during daylight to gauge potential hazards.
2. Human vision is substantially diminished during low light. With increased distances, color, detail, shape, shade, and shadows are less clear. Also, red lights can disturb our vision. For these reasons, a Recreational sUAS Pilot in Command should allow their eyes to adjust to the dark, should avoid exposure to unnecessary lighting and should scan



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the sky utilizing off-center viewing to mitigate hazards created from blind spots. The FPVFC recommends anyone flying sUAS at night to read chapter 11 on Night Operations in the Airplane Flying Handbook.

Operations Over People:

Flying over people is not explicitly prohibited under 44809, and the FAA AC 91-57C encourages CBO Safety Guidelines to include restrictions on operations over people. Flying over people could be dangerous and could be considered reckless. Either of those aspects could result in a local or federal municipality fining the operator or confiscating the aircraft. For these reasons, FPVFC recommends not flying over people.

FPV Racing Operations:

FPV Racing is a sport utilizing FPV aircraft typified by maneuvering through 3D obstacles strung together to create a course in a volume generally of but not limited to 200 ft x 100 ft x 75 ft. Since FPV Racing is done in a controlled environment, the decreased and controlled risks associated with such allow for the modified guidelines below.

Visual Observers:

For FPV Racing, Pilots are required to have a Visual Observer in order to maintain VLOS as per the VLOS Clarification in the beginning of these guidelines.

There are two options race operations have to fulfill the Visual Observer requirement:

1. Each pilot has an individual Visual Observer maintaining VLOS
2. The Race Director is or designates another party to be the Visual Observer maintaining VLOS for up to eight pilots at a time with the help of Spotters for each pilot who watches the FPV video feed for additional situational awareness information.

Tip for Visual Observers is as follows:

- During a race the aircraft should be following a specified flight plan (aka the racecourse) and as the aircraft flies in and out of gates, it may be more difficult to observe deviations. To mitigate this, the change of position of the aircraft silhouette can be used to determine direction of the aircraft as change of position is velocity and velocity is a vector and a vector has direction. This is applicable for day and nighttime operations.

Set-back distances for FPV racing:

The FPVFC recommends two sets of set-back distances:

1. Unregistered sUAS: No setback distance. Under 250 g racing takes place both indoors and outside. These aircraft normally have shrouded props and the amount



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of kinetic energy these micro aircraft can transfer in a crash is very small. As technology improves, these aircraft are expected to get lighter and safer. In the several years of racing with Unregistered aircraft, major incidents have not been found. FPVFC will continue to monitor trends and if Unregistered aircraft appear to have an increased safety risk, these guidelines will be updated to account for it.

2. Registered sUAS: Minimum of 25 ft setback from the racecourse. Depending on the local environment, optional safety precautions can include but not limited to:
 - a. Safety netting: if netting is used, a minimum set-back distance of 10 ft is acceptable.
 - b. Further setback distance, for instance if flying aircraft greater than 5 lbs. (2.27 kg) a setback distance of 50 ft without netting may be more applicable.
 - c. Covered areas for pilots such as canopies, tents, fixed structures, etc.
 - d. Pilot/Spectator area parallel to track flight line or turning away from the area.
 - e. If there are a large number of people at the event a further setback distance may be beneficial, for instance under 30 people at the event, 25 ft is sufficient, if greater than 30 people then a further setback distance of 50 ft may be more applicable.

A FPV racecourse is highly three dimensional where a pilot must fly to a gate and for example circle around it or fly up or down the gate. In other words, a FPV racer spends much of the race maneuvering around a gate and not flying long, straight flight paths toward the pilots or spectators.

In case of emergency at an FPV Race:

Emergencies during a FPV race: Like other types of racing, if a vehicle can cross a finish line, there is no emergency. Therefore, if a UA in a race poses an acceptable level of risk to pilots, race operation personnel or spectators, no emergency exists.

Unanticipated people or aircraft entering the area of operation:

1. Other non-participating aircraft entering the area: FPV Races normally fly no higher than 50 to 75 feet AGL. It would be unusual for a manned or crewed aircraft to enter the airspace volume where a FPV race is taking place. If that happens, sUAS must give way to all manned or crewed aircraft. If a crewed aircraft enters the area of operation, fly away from the aircraft or disarm, whichever is safer, as soon as possible.
2. If people enter the area of operation: the race director/organizer will determine the best course of action. The best course of action may be to disarm all aircraft immediately, fly the aircraft to a predetermined designated safe area for landing,



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or something else that is situationally dependent for each individual field. Since each field is different, it is not practical to come up with a one stop decision for all racing operations. The race director should create their own plan for their specific location/events.

3. As time goes by, FPVFC will monitor trends in these incidents and adjust guidelines accordingly.

Parts or attachments of the sUAS become loose or break off:

A FPV race is a controlled, very low altitude (less than 50 to 75 feet AGL) operation. Parts may become loose on a FPV sUAS. If no safety risk is posed to the pilot, race operations or spectators, the FPV racer is encouraged to continue the race.

Electrical arcing or battery or component fire:

It is highly unusual for a sUAS to arc or catch on fire in the air. Normally, the most likely time of a fire is if a FPV sUAS is in a bad crash and the battery remains connected. If the battery is punctured, it will likely catch on fire, and it should be handled as if it will immediately catch fire. Keep a fire extinguisher or sand bucket on hand for such an emergency.

In the highly unlikely event of an in-air fire, the best thing to do is disarm the aircraft, switch failsafe to ON (assumes you have set failsafe on a switch), or shut off the transmitter to engage Failsafe.

Night Operations for FPV Racing

Some additional but not limited to recommendations/cautions for night racing but not required to follow these guidelines are as follows:

- If lighting is determined necessary to maintain VLOS do not use a lighting device that is too bright such that it may impair video feeds of other pilots. To better determine what is too bright, look for reviews of the planned lighting device or test them by shining them in front of an FPV Camera and see if the screen becomes washed out.
- An option to improving ambient light at night is to add lighting such as rope LEDs to the gates such that they illuminate the gate and some of their surroundings.

Alcohol or Drugs and Drones don't mix for general FPV sUAS flight:

Crewed aircraft pilots have learned many acronyms to remind them to be extra safe. The FPVFC recommends not drinking or taking recreational drugs and flying in FPV races. FPV Racers should not fly while taking prescription drugs if the drug interferes with the racer's ability to operate the sUAS safely.



The FPVFC participated in a Drone Advisory Committee Safety Culture Tasking Group in 2021. One of the major ideas that came out of that Tasking and was agreed to by the FAA is with Safety, One Size Does Not Fit All. In other words, Safety guidelines should be proportional to the risk. In other words, the following IMSAFE acronym has a different meaning if an FPV operator is flying a micro sUAS or participating in a FPV race with a 5” propped sUAS. Common sense is required to understand the operation and what level of IMSAFE is unsafe.

- Illness—Is the recreational operator suffering from any illness or symptoms that might affect the safe operation of the UAS?
- Medication—Is the recreational operator taking any drugs (prescription or other) that might affect the safe operation of the UAS?
- Stress*—Is the recreational operator experiencing any psychological or emotional factors which might adversely affect his or her performance?
- Alcohol—Has the recreational operator been drinking within the last 8 hours? Depending on the amount of alcohol consumed, full metabolization can take up to 24 hours. Recreational flyers should be aware that as little as one ounce of liquor, one bottle of beer, or four ounces of wine can impair flying skills.
- Fatigue**—Has the recreational operator received sufficient sleep and adequate rest in the recent past?
- Emotion—Is the recreational operator emotionally upset.

*Stress is a normal part of competition. Like all the FPVFC Safety Guidelines, we encourage commonsense interpretation. We include Stress in this section of the FPVFC Safety Guidelines to mean a level of stress that would prevent a FPV operator from controlling his or her UA safely. We expect and love the stress and excitement of participating in FPV racing. That said, we recommend that FPV racers not fly UA’s when their level of stress is so high they cannot fly safely.

Another aspect of stress in recreational FPV should be noted. We have experienced and have FPV community members share with us that a leading attribute of FPV UA flight is stress relief. This is so profound that individuals with chronic pain or suffering from PTSD convey to us that FPV flight helps relieve stress. We point this out to again emphasize common sense. If an individual has had a difficult day and takes a FPV UA flight to relieve stress, we assume this individual is able to control the UA safely. And the level of risk is proportional to the safety precautions taken.

**Fatigue. Fatigue is an accepted component in any competition. Fatigue in FPV racing is no different. FPV racers should stop racing if they are fatigued to the point of being incapable of racing. Once again, the level of risk to pilots, people involved in the race and spectators is low at any time in a FPV race. These are small UA’s flying away from a group.

Reporting safety incidents:

As Recreational sUAS operations are among the safest hobby in the world, our current efforts surround these three areas:



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Actions to be taken by FPVFC members and leadership in the case of an incident or emergency of a sUAS:

- Ensure everyone is safe.
- Ensure fire extinguishers are readily accessible.
- Ensure a First Aid kit is readily accessible.
- Deal with injuries or the situation.
- Note any material damage to property beyond sUAS damage and report it to the individual(s) in charge of the location.
- All incidents or emergencies resulting in serious injury should be reported to FPVFC representatives to ensure any resulting course of action. Serious injury is defined here as requiring an over-night hospital stay.
- As UAS ASRS is made available to the public via mobile apps, consider reporting incidents to advance best practices. Especially those relating to battery safety, propeller safety and airspace authorization.

If you identify a best practice and want to share it with the FPVFC community, please let us know via the Contact Us form on the <http://www.fpvfc.org> website.

Requests for Deviations to or Updates to the FPVFC Safety Guidelines:

If you believe something is incorrect for FPV in these Safety Guidelines you may also reach out to FPVFC with a request to update the suspected error or receive further clarification on why the statement was made.

Definitions and FPVFC Safety Guidelines conventions:

In addition to private use of these FPVFC Safety Guidelines, an educational institution may also use these guidelines to define their flight as recreational. This includes higher education institutions as defined in AC 91-57C section 2.2.1.1.



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- **BVLOS.** Beyond Visual Line of Sight. This means flying a UA beyond the point where an operator may see the UA without the aid of binoculars or other devices.
- **Controlled Airspace.** That airspace which has an Air Traffic Controller managing crewed aircraft traffic.
- **Controller** (GCS, Transmitter). The electronic device held by the operator to fly a UA. This is also called a Ground Control Station. A legacy term is Transmitter as that is all the device did with Radio Control model aircraft in the past.
- **Class B, C, D, E and G airspace.** Controlled airspace. If you are located in Class B, C, D or E you must gain FAA authorization prior to flying. Class G is also called, “Uncontrolled” and does not require FAA authorization.
- **Flyer.** The individual manipulating the sticks of the Controller to fly the UA. This document will use the term operator as that is the official FAA term. Once an individual passes the part 107 exam, he or she is then a UA Certified Pilot. Recreational operators are not considered pilots.
- **FPV.** First Person View. This is the video camera and video transmitter that sends a video feed to the operator who is also manipulating the sticks to control the UA.
- **Homebuilt Unmanned Aircraft.** As defined by the FAA, any aircraft which is built by the owner and is intended for recreational or educational use.
- **LOS.** Line of Sight. This is the requirement to keep a UA unaided (except by corrective lenses) within visual line of sight by the operator.
- **NAS.** National Airspace. The FAA is the sole authority in the USA who has the authority to set rules in the airspace above all parts of the USA, public and private.
- **Night Flight.** As defined by the FAA, it is flight during the period between the end of evening civil twilight and the beginning of morning civil twilight.
- **Operator.** As noted in Flyer definition above, this document will use the FAA defined term, Operator as the individual manipulating the sticks of a recreational UA.
- **OSD.** On Screen Display. This is the display of primarily telemetry data in the FPV goggles or display. OSD is an overlay of information including GPS location, battery consumed, duration of flight signal strength, video channel #, etc.
- **Pilot.** A recreational operator, as defined by the FAA is not a pilot. When an individual passes the exam for part 107, that individual is then an Unmanned Aircraft Certified Pilot.
- **Race Director/Organizer.** A race director or organizer is the person hosting and/or managing the race or event. This can be anyone who is willing to host and manage a race. (Not apart of these guidelines, but beneficial resources for learning how to host and manage a race can be found at MultiGP, <https://www.multigp.com/organizer-resources/>)
- **RTH.** Return to Home. An autonomous aircraft function which takes over control of the UA and returns it to the takeoff location.
- **RTL.** Return to Launch. Like RTH but used by autonomous platforms like ArduPilot to return the UA to a predefined location and then loiter, allowing the operator to resume control.
- **RSSI.** Received Signal Strength Indicator. This is a telemetry value indicating the strength of the signal between the UA and the controller. This is frequently shown in the OSD, so the operator knows when the UA is about to have a diminished signal.
- **Spotters.** Similar to a VO but is not required to maintain VLOS. Essentially a person who watches the FPV feed or aircraft of another pilot to keep the pilot on track in a course or keep track of where an aircraft is if it goes down.
- **sUAS.** Small Unmanned Aircraft System. As defined by the FAA, an unmanned aircraft weighing more than 0.55 and less than 55 pounds.
- **Uncontrolled Airspace.** As described above, uncontrolled airspace is that airspace that is not managed by an Air Traffic Controller. This airspace is classified as G.
- **VO.** Visual Observer. A VO is required to be co-located with a FPV operator to detect other aircraft in the vicinity of the UA of the VO's assigned recreational operator.