



# FAA UAS SYMPOSIUM



## How To: Get an Ops Over People Waiver

Ryan Steinbach

FAA UAS Technical Advisor and Safety  
Analyst, Flight Standards Service



Federal Aviation  
Administration



# Risk: Likelihood x Severity

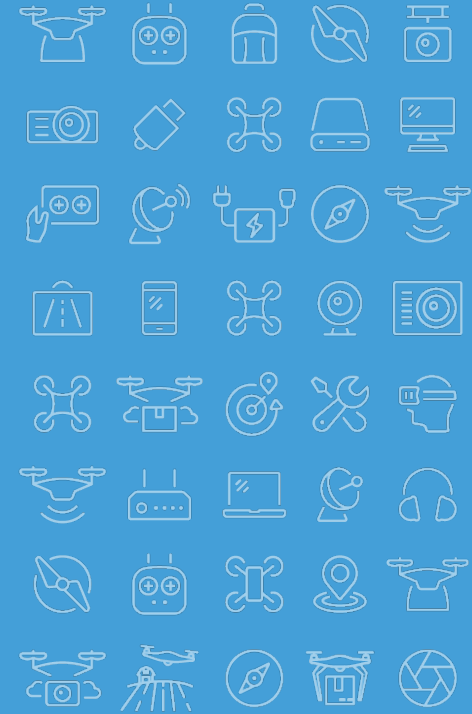


- Severity: Hazardous
- Likelihood: Unknown



- Severity: Catastrophic
- Likelihood: Extremely Improbable

# Operations Over People: What Part 107 says



## §107.39 Operation over Human Beings

No person may operate a small unmanned aircraft over a human being unless that human being is:

- (a) **Directly participating** in the operation of the small unmanned aircraft or;
- (b) Located under a covered structure or inside a **stationary** vehicle that can provide reasonable protection from a falling sUA

**Directly participating** means crewmembers necessary for the safety of the sUAS operation, as assigned and briefed by the RPIC. These are not the people being filmed or on the scene.



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# Why is This a Big Deal?

## Injury to Persons



- A UAS falling from the sky can cause severe damage to people from weight alone



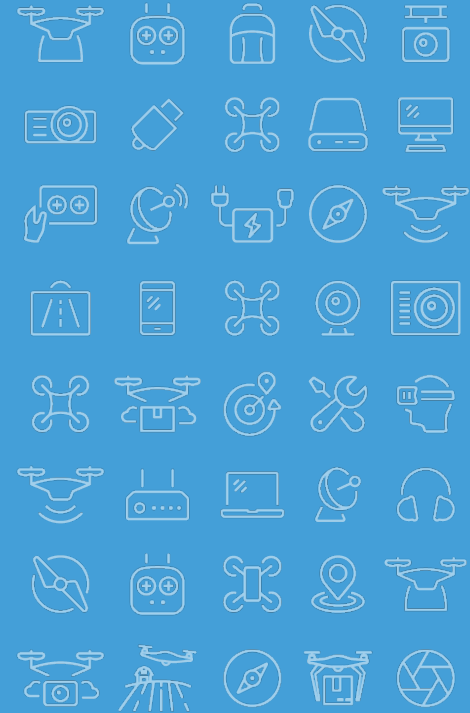
- Average speed of rotor blades around 5,000-7,000rpm



Serious harm to people we all care about and serious harm to UAS industry as a whole

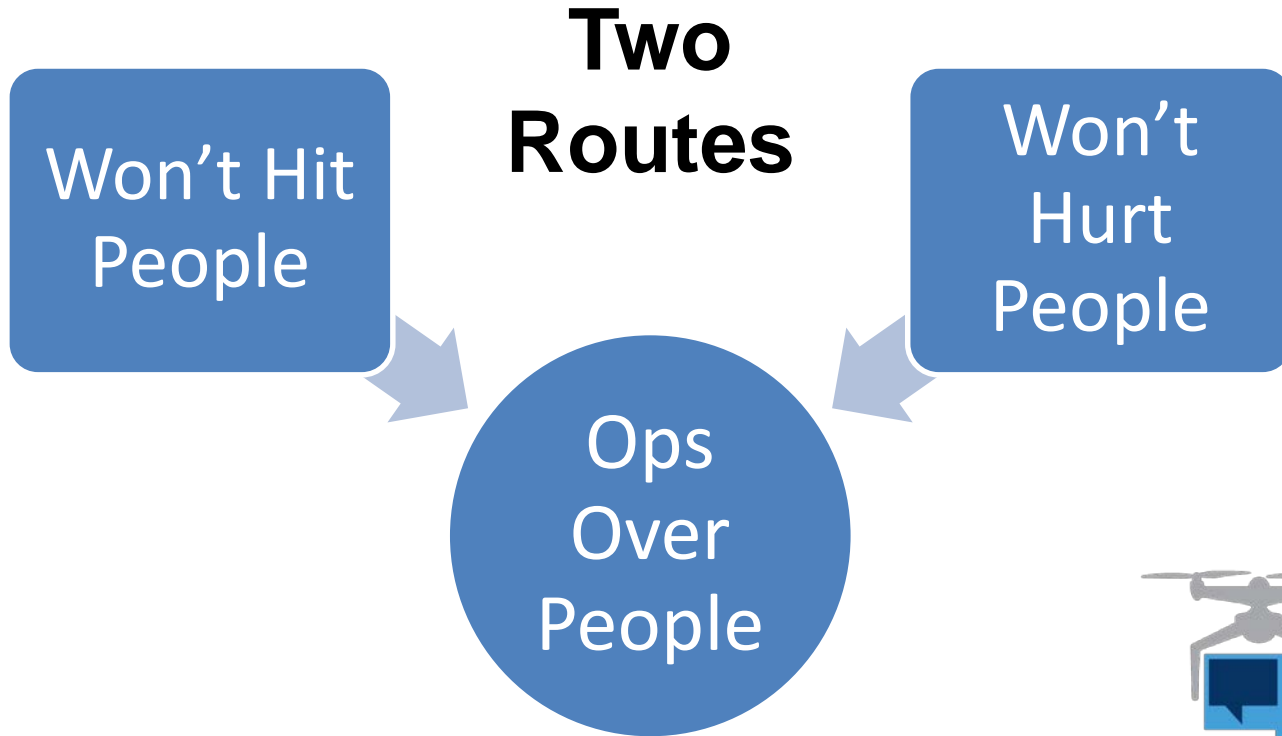


# OK, I Don't Want to Hurt Anyone: How Do I Get a Waiver to Fly Over People Safely?



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# What the FAA Needs From You



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# Proving You Won't Hit People (Addressing Likelihood)



Traditionally accomplished through certification declaring aircraft is airworthy and pilot qualified.

Data you need to support your claim: (CASS)

- Mean time between failure testing
- Reliability or maintenance program
- Life limits on parts
- System architecture analysis
- Hardware reliability analysis
- Software design assurances and control
- Any operational restrictions or limitations associated with assumed reliability level



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# Proving You Won't Hit People (Addressing Likelihood)



- Keep meticulous records and record every time something happens that shouldn't
- Identify trends and recurring hazards, develop aircraft fixes or operational mitigations
- Build significant sample of data to demonstrate safety of aircraft, navigation, and control systems that is suitable for the proposed operation and effectiveness of mitigations



**Ask About the FAA's  
Streamlined TC Process!**



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# Proving You Won't Hurt People (Addressing Severity)

**FAA NPRM lays out three categories to aim for:**

**Category 1:** Weight-based; all small UAS 0.55 pounds or less

**Category 2:** Injury-based; the small unmanned aircraft not capable of causing an injury more severe than an impact kinetic energy transfer of 11 ft. lbs. from a rigid object.

**Category 3:** Injury-based with operational restrictions; the small unmanned aircraft not capable of causing an injury more severe than an impact kinetic energy transfer of 25 ft. lbs. from a rigid object, provided the remote pilot complies with additional operational restrictions.



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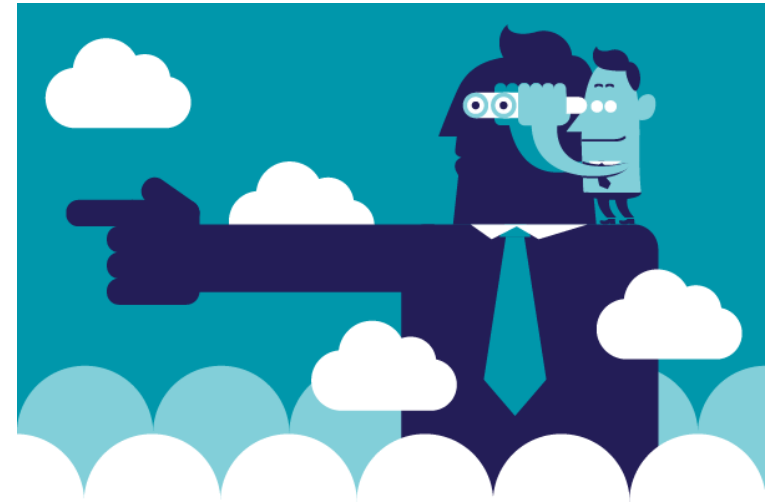


# Remember: Details and Context Matter

- Keep meticulous records and perform collision and drop testing to determine the amount of energy your selected UAS transfers on impact with a person.
- Be sure to account for how the aircraft either absorbs or disperses kinetic energy compared to a rigid object in your test reports.

**OR**

- **Build from the successes of others!**



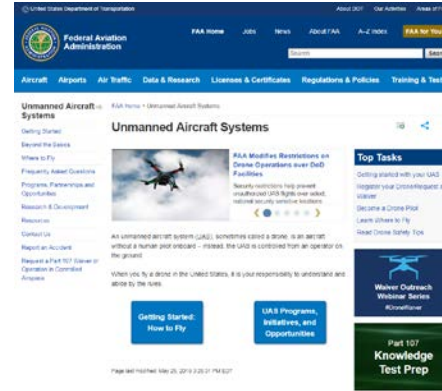
# Resources





## FAA UAS Website

- One-stop shop for all UAS information and resources
- [www.faa.gov/UAS](http://www.faa.gov/UAS)



## DroneZone Documents

- Application instructions
- Waiver Safety Explanation Guidelines
- [faadronezone.faa.gov](http://faadronezone.faa.gov)

### Part 107 Waivers & Authorizations

sUAS operators who want to fly outside the requirements of the Small UAS Rule (Part 107) may request a waiver and/or airspace authorization using the provided tools.

Applicants are encouraged to review the [list of regulations](#) subject to waiver and have these resources available when creating an Operational Waiver application:

- [Step-by-Step Application Process Guidance](#)
- [How to Apply for an Operational Waiver \(PDF\)](#)
- [Waiver Safety Explanation Guidelines](#)

Applicants are encouraged to review and have these resources available when creating an Airspace Authorization or Airspace Waiver application:

- [Step-by-Step Application Process Guidance](#)
- [How to Apply for an Airspace Authorization/Waiver \(PDF\)](#)

These tools should only be used to request waivers or authorizations for operations flown under Title 14 Part 107. They are not intended for operations flown in accordance with the Special Rule for Model Aircraft.



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# Webinar Series Website

- Access previously recorded webinars
- Find all supporting documents used during webinar
- [www.faa.gov/go/waiver](http://www.faa.gov/go/waiver)

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## Webinar Series – How to Apply for an Operational Waiver

**Registration is full.**

You may sign up for the next webinar's wait list here: <https://dronewebinarseries.eventbrite.com>. A wait list will open two weeks prior to each of the remaining webinars. A recording of each webinar will be posted on this page.

The FAA is hosting a **summer webinar series** to help drone operators submit better waiver requests when applying for an operational waiver. During the webinars, FAA experts will address:

- The waiver application process
- When to apply for a waiver
- Common waiver requests
- Common waiver application mistakes
- Risk management, hazard recognition, risk analysis and assessment

Each webinar is live – ask FAA experts your most pressing waiver questions! See the [schedule below](#) for topics.

Webinars are hosted through [Adobe Connect](#). Download the Adobe Connect smartphone/tablet app or use the link provided in your registration confirmation email. Participants are encouraged to read the [Adobe Connect How-To guide](#) (PDF) ahead of the webinar

**Top Tasks**

- Getting started with your UAS
- Register your Drone/Request a Waiver
- Become a Drone Pilot
- Learn Where to Fly
- Read Drone Safety Tips

**Part 107 Knowledge Test Prep**

**B4UFLY Mobile App**



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# Questions?



# Background





# FAA Risk Matrix

FAA reviews safety of operations in terms of **severity** and **likelihood** of risk

| Severity \ Likelihood     | Minimal<br>5 | Minor<br>4 | Major<br>3 | Hazardous<br>2 | Catastrophic<br>1 |
|---------------------------|--------------|------------|------------|----------------|-------------------|
| Frequent<br>A             | [Green]      | [Yellow]   | [Red]      | [Red]          | [Red]             |
| Probable<br>B             | [Green]      | [Yellow]   | [Yellow]   | [Red]          | [Red]             |
| Remote<br>C               | [Green]      | [Green]    | [Yellow]   | [Yellow]       | [Red]             |
| Extremely Remote<br>D     | [Green]      | [Green]    | [Green]    | [Yellow]       | [Red]<br>[Yellow] |
| Extremely Improbable<br>E | [Green]      | [Green]    | [Green]    | [Green]        | [Yellow]          |



# 8040 Risk Definitions - Severity

| Minimal                  | Minor                                                                      | Major                                                                                  | Hazardous                                                                                                                                     | Catastrophic                                                                                       |
|--------------------------|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Negligible safety effect | Physical discomfort to persons<br><br>Slight damage to aircraft or vehicle | Physical distress or injuries to persons<br><br>Substantial damage to aircraft/vehicle | Multiple serious injuries;<br><br>fatal injury to a relatively small number of persons (one or two);<br><br>or a hull loss without fatalities | Multiple fatalities (or fatality to all on board)<br><br>usually with the loss of aircraft/vehicle |



# 8040 Risk Definitions - Likelihood

| Frequent                                       | Probable                                            | Remote                                             | Extremely Remote                               | Extremely Improbable                                |
|------------------------------------------------|-----------------------------------------------------|----------------------------------------------------|------------------------------------------------|-----------------------------------------------------|
| Expected to occur more than 100 times per year | Expected to occur between 10 and 100 times per year | Expected to occur one time every 1 month to 1 year | Expected to occur one time every 1 to 10 years | Expected to occur less than one time every 10 years |
| more than approximately 10 times a month       | approximately 1-10 times a month                    |                                                    |                                                |                                                     |

