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

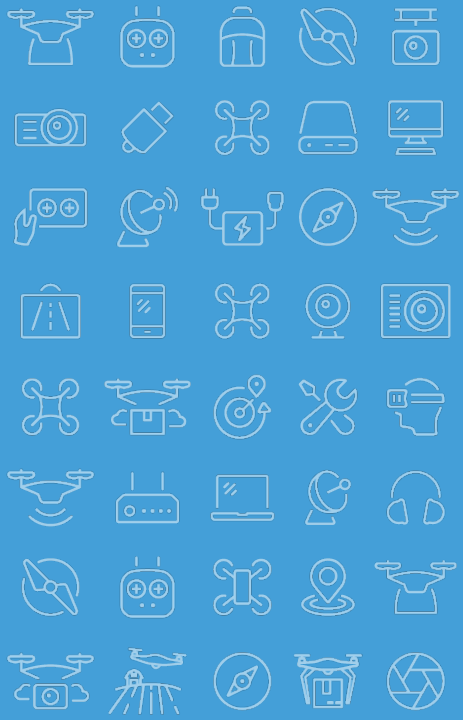
AUVSI

Risk: Likelihood x Severity

- Severity: Hazardous
- Likelihood: Unknown

- Severity: Catastrophic
- Likelihood: Extremely Improbable

Operations Over People: What Part 107 says



FAA UAS SYMPOSIUM

§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.

FAA UAS SYMPOSIUM

#UAS2019

Why is This a Big Deal?

FAA UAS SYMPOSIUM

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?

FAA UAS SYMPOSIUM

What the FAA Needs From You

Two Routes

Won't Hit People

Won't Hurt People

Ops Over People

FAA UAS SYMPOSIUM

#UAS2019

Proving You Won't Hit People (Addressing Likelihood)

FAA UAS SYMPOSIUM

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**

Proving You Won't Hit People (Addressing Likelihood)

FAA UAS SYMPOSIUM

- 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!

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.

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

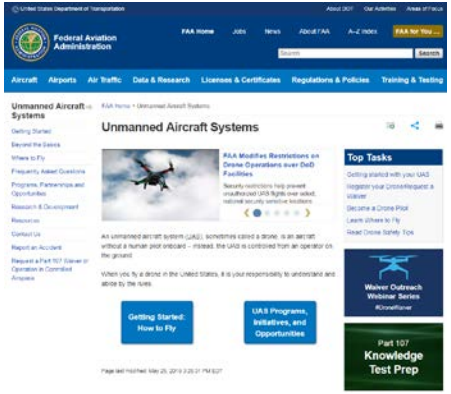
- **Build from the successes of others!**

Resources

FAA UAS SYMPOSIUM

FAA UAS Website

- One-stop shop for all UAS information and resources
- www.faa.gov/UAS



FAA UAS SYMPOSIUM

DroneZone Documents

- Application instructions
- Waiver Safety Explanation Guidelines
- 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

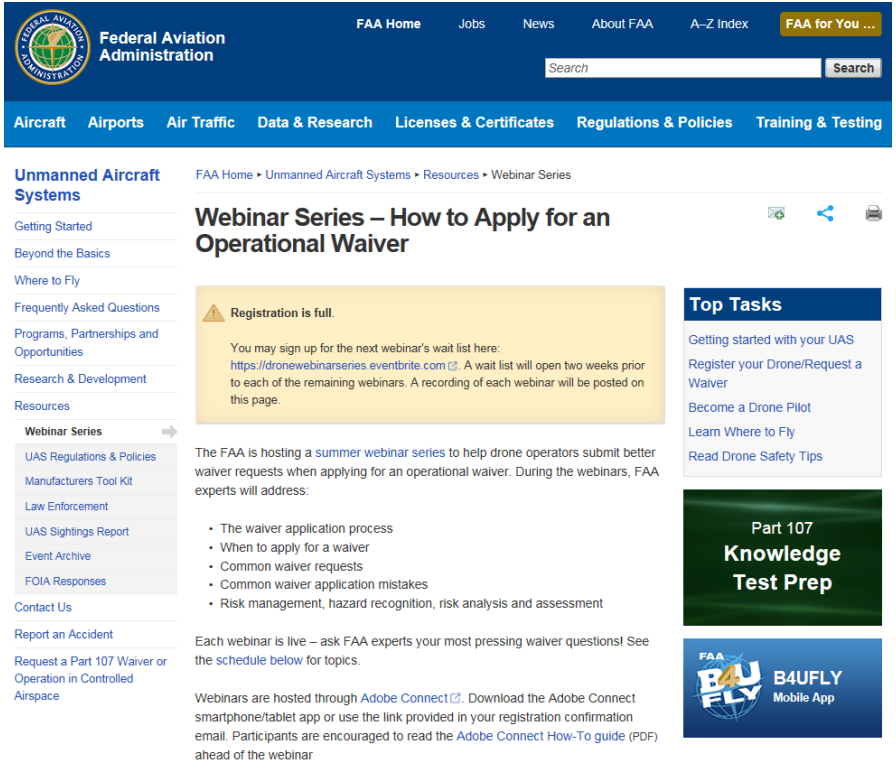
Applicants are encouraged to review and have these resources available when creating an Airspace Authorization or Airspace Waiver application:

- 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.

Webinar Series Website

- Access previously recorded webinars
- Find all supporting documents used during webinar
- www.faa.gov/go/waiver



#UAS2019

Questions?

Background

FAA UAS SYMPOSIUM

FAA Risk Matrix

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

Severity / Likelihood	Minimal 5	Minor 4	Major 3	Hazardous 2	Catastrophic 1
Frequent A	[Green]	[Yellow]	[Red]	[Red]	[Red]
Probable B	[Green]	[Yellow]	[Yellow]	[Red]	[Red]
Remote C	[Green]	[Green]	[Yellow]	[Yellow]	[Red]
Extremely Remote D	[Green]	[Green]	[Green]	[Yellow]	[Red] / [Yellow]
Extremely Improbable E	[Green]	[Green]	[Green]	[Green]	[Yellow]

8040 Risk Definitions - Severity

Minimal	Minor	Major	Hazardous	Catastrophic
Negligible safety effect	Physical discomfort to persons Slight damage to aircraft or vehicle	Physical distress or injuries to persons Substantial damage to aircraft/vehicle	Multiple serious injuries; fatal injury to a relatively small number of persons (one or two); or a hull loss without fatalities	Multiple fatalities (or fatality to all on board) 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 more than approximately 10 times a month	Expected to occur between 10 and 100 times per year approximately 1-10 times a month	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