



FAA UAS SYMPOSIUM

Submitting Operational Waiver Requests



Federal Aviation
Administration



Submitting Operational Waiver Requests



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Overview



- Waiver Policy and Enhancements
- FAA DroneZone
- Waiver Application
- Waiver Safety Explanation Guiding Questions
- Risk Analysis

Waiver Policy and Enhancements

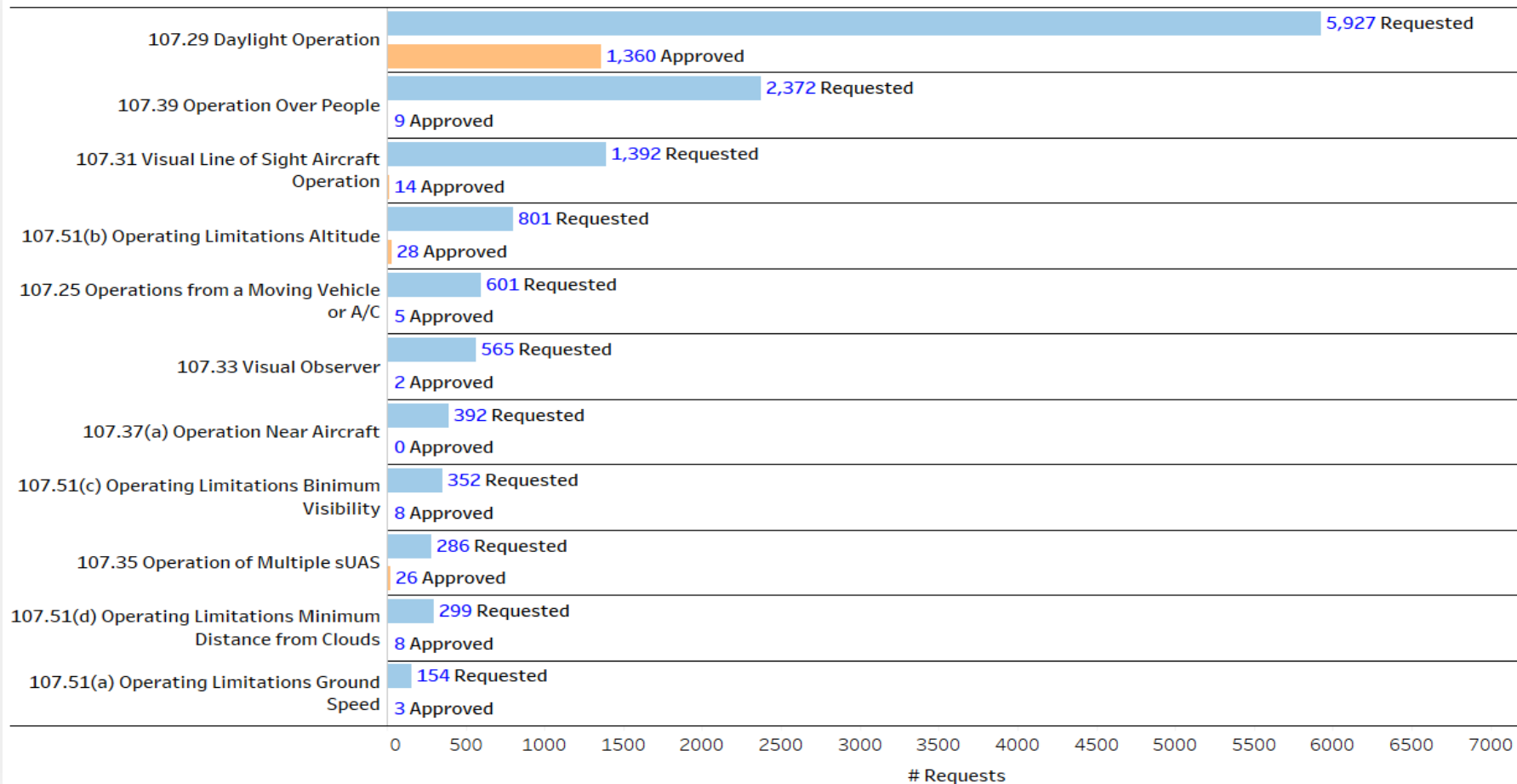


- Waiver Safety Explanation Guidelines
- FAA DroneZone and Functional Improvements
 - Interview style application process
 - Significantly reduce incomplete applications
 - UAS specific risk assessment methodology
 - Supporting technology and data management
- Statistics

Regulations Requested vs. Approved



Regulations Requested to be Waived vs Approved



Average Processing Time (Monthly)




Monthly Average of Waiver Request Processing Time



Waiver Safety Explanation Guidelines




 Federal Aviation Administration

LOG IN | CONTACT

FAADroneZone

Welcome to the FAADroneZone



Fly sUAS under Part 107

I need to register my small unmanned aircraft for recreational, commercial, governmental, or other purposes under **Part 107**. Each drone must be registered at a cost of \$5.00 and registration is valid for a period of 3 years. Also use this option to apply for a waiver/authorization, or reporting an accident under Part 107.

Register ?

Fly Model Aircraft under Section 336

I need to register my small unmanned aircraft to fly with an aero-modeling club and following all requirements of the **Special Rule for Model Aircraft**

Register ?

Already registered? [Log In](#) to your existing account.

For general information about drones, [rules for flying](#), and how to [become a drone pilot](#), visit the [FAA website](#).

[Register a drone that weighs 55 lbs. or more.](#)

Guiding Questions



Designed to assist with completing a waiver application, including the risk assessment:

- Concept of operations (CONOPS)
 - Who, what, where, when & how
- Operational risks and mitigations
 - Identify all of the possible hazards (**what could go wrong**), and describe the ways in which the applicant has addressed the risk (**what has been done to keep the bad things from happening**)

Guiding Questions



What are the primary concerns?

- How the operation(s) remains at an acceptable level of safety at all times, including during unusual or contingency circumstances?
- What kinds of circumstances could arise, and how the applicant plans to handle each, including contingencies & emergencies?

Guiding Questions




Example of Guiding Question for Pilot/Personnel:

“What kind of training, if any, will personnel have prior to flying under the waiver?”

- ~~“I will make sure they’re trained”~~
- How will they be trained
- How do you know they are competent and have operational knowledge
- Will you administer exams and if so how
- Will there be recurrent training

Risk Assessment



 U.S. Department of Transportation Federal Aviation Administration	<h1>Advisory Circular</h1>	
Subject: Small Unmanned Aircraft Systems (sUAS)	Date: 6/21/16 Initiated by: AFS-800	AC No: 107-2 Change:

- Information on risk assessment can be found in FAA Advisory Circular 107-2, available on the FAA's Unmanned Aircraft Systems web site.
 - Guidance for conducting sUAS operations in the NAS in accordance with 14 CFR part 107
 - Appendix 'A' details a basic strategy for completing a risk assessment

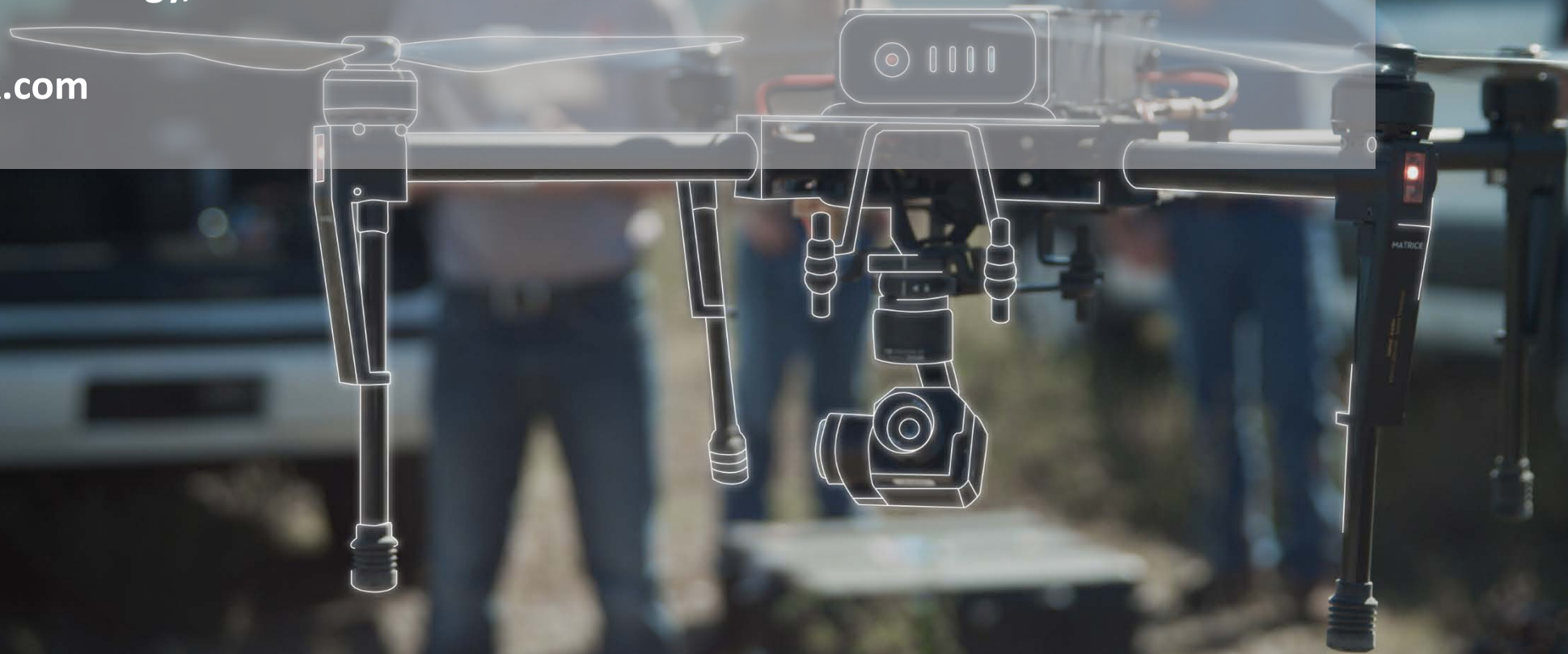
Expanded Operations Waivers – The PrecisionHawk Experience

FAA Symposium, March 7, 2018

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Expanded Operations Timeline



Night Operations Waiver

- Application completed outside the scope of Pathfinder Program
- Process:
 - Reviewed FAA guidance on night operations waivers
 - Looked at a few samples of published waivers and reviewed the Specific Provisions
 - Worked with internal flight operations team to determine how we would conduct our night operations safely
 - Identified training materials on night operations, developed curriculum and test for pilots
 - Talked to other operators who had experience flying at night
 - Submitted waiver application... waited... responded to multiple FAA requests for additional information

Night Operations Waiver Application

- Must include...
 - Method for PIC to maintain VLOS
 - Method for PIC to see and avoid other aircraft, people and structures
 - Method for PIC to continuously know position, altitude, orientation, movement of sUAS
 - Knowledge materials and method for ensuring personnel understand how to operate safely at night
 - Method to increase conspicuity of sUAS to be seen up to 3 miles OR system to avoid aircraft

BVLOS Waiver

- Backed by Pathfinder Research
- Significant financial investment conducting research for over a year by the time our waiver was granted
- Waiver application included 40 pgs of documentation – see my 2017 Symposium Presentation for details of CONOPS and ORA
https://www.faa.gov/uas/resources/event_archive/2017_uas_symposium/media/Workshop_5_Part_107_Waiver_Process.pdf
- Waiver permits
 - Operations in class G air space outside of built up areas
 - Operations covering around 38 square nm (vs. 3.14 VLOS)
 - Does not require VO – option to extend area using Remote VO, however neither PIC nor RVO needs to see the UAS
 - Is not limited to a specific UAS type

BVLOS Waiver Application

Must include...

- Safety case that mitigates risks of proposed operation to acceptable level
- Method for Remote PIC to ensure separation from other aircraft
- Method for Remote PIC to know location, altitude, orientation and direction of sUAS
- Method for avoiding flying over people
- Method for determining operating limits of command and control links (i.e. How will PIC know if GPS is available? What if GPS fails?)
- Training program and qualifications for flight personnel
- Description of (performance-based) requirements that the UAS's used under the waiver will conform to

BVLOS Waiver Stats & Trends

- As of Feb, 2018, FAA granted 15 BVLOS waivers to 11 operators
- All waivers except PrecisionHawk and FLIR's require at least 1 VO (several require multiple VOs, i.e. the "FPV waivers").
- Some waivers limited to specific UAV model, while others are broader and based on performance based capabilities
- 4 waivers limited to specific geographic coordinates
- Key take-away → NO single Concept of Operations or Operational Risk Assessment for BVLOS operations and waivers!

How to Get to BVLOS

Gain VLOS experience with UAV

Pilot uses vision to separate UAV from aircraft. Pilot learns normal and emergency procedures, gains familiarity with how the platform performs.

Pursue localized BVLOS operations

Focus on pilot training and operating procedures to maintain separation, i.e. Pilot uses vision to scan airspace and detect manned aircraft.

Advance to longer distance BVLOS operations

Pilot uses technology to ensure separation: 1) track UAV position, 2) track cooperative manned aircraft, 3) detect non-cooperative manned aircraft. See Pathfinder FA2 Phase 3 Report, coming out soon.

