



## What Do I Need to Know About Drones?



Rick Braunig  
Manager, Aviation Safety and Enforcement

October 23, 2018

# Drone Contact at MnDOT

Tony Fernando

UAS Program Administrator

[Anthony.Fernando@state.mn.us](mailto:Anthony.Fernando@state.mn.us)

651-234-7227 or 800-657-3922

## My Bio

- Degree in Aerospace Engineering and Mechanics
- Commissioned Naval Aviator Flying Helicopters for 10 years
- Worked for NavAirSysCom in Combat Damage Assessment
- Spent the summer of 2005 in Iraq assessing battle damage and retired in 2007 at the rank of Captain
- Flew for MnDOT for 28 years, amassed over 7,000 flight hours
- Manage the Aviation Safety and Enforcement Section of the Office of Aeronautics

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## Pre-Test

- I got a drone for Christmas and I want to fly it in my backyard and I'm going to stay below the roof level of my house. Can I legally make this flight?
- I got some really cool pictures with my drone and the local TV station want to use them on the news. Does this make me a commercial operator? Even if they don't pay me?
- We are working a crash site and this guy has his drone buzzing around. I want him to stop, but can I legally require him to land that annoying thing?
- I'm operating my drone for the police department. What regulation exempts me from having to comply with MnDOT and FAA requirements?

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## Outline

- MnDOT Rules and Statutes
- Drone Safety
- FAA Regulations and Local Ordinances

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## Minnesota Requirements for Operating a UAS Commercially

- Aircraft Must be Registered with MnDOT
- Aircraft Must be Insured
- Operator may be required to have a Commercial Operations License

## Minnesota Statute 360.018 REGULATING AIRCRAFT, AIRMEN, AIRPORTS, INSTRUCTORS.

- **Subd. 3. Exceptions to registration requirements.**
- The provisions of subdivision 1, paragraphs (1) and (2), and subdivision 2 shall not apply to: ...
- **(7) persons operating model aircraft**, nor to any person piloting an aircraft which is equipped with fully functioning dual controls when a licensed instructor is in full charge of one set of said controls and such flight is solely for instruction or for the demonstration of said aircraft to a bona fide prospective purchaser;

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### • **360.59 AIRCRAFT REGISTRATION AND LISTING FOR TAXATION.**

#### **Subd. 10. Certificate of insurance.**

(a) Every owner of aircraft in this state when applying for registration, reregistration, or transfer of ownership shall supply any information the commissioner reasonably requires to determine that the aircraft during the period of its contemplated operation is covered by an insurance policy with limits of not less than \$100,000 per passenger seat liability both for passenger bodily injury or death and for property damage; not less than \$100,000 for bodily injury or death to each non-passenger in any one accident; and not less than \$300,000 per occurrence for bodily injury or death to non-passengers in any one accident.

<https://www.revisor.mn.gov/statutes/?id=360.59>

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## Minnesota Commercial Operations License

### **8800.3100 DEFINITION OF COMMERCIAL OPERATIONS.**

"Commercial operations" means any operation of an aircraft for compensation or hire, or any services performed incidental to the operation of any aircraft for which a fee is charged or compensation received including, but not limited to, ...

"Commercial operations" also means the brokering or selling of any of these services but does not include any operations of aircraft as common carriers certificated (certified) by the federal government or the services incidental to certificated operations.

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## Minnesota Commercial Operations License

### **8800.3200 LICENSING COMMERCIAL OPERATIONS.**

#### **§ Subpart 1. Prior licensing required.**

Every person who does in fact provide or who advertises, represents, or holds themselves out as giving or offering to provide service as defined in part [8800.3100](#), must be licensed by the commissioner. ... These persons must be licensed by the commissioner before they advertise, represent, or hold themselves out as giving or offering to provide this service.

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## Licensed Drone Operators can be found on MnDOT Web site

STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION OFFICE OF AERONAUTICS		04-Oct-18
<b>COMMERCIAL OPERATORS LISTING</b> License Type - Unmanned Aerial Vehicle		
COMPANY NAME	Alex Air Apparatus, Inc.	
CONTACT PERSON	Alan Ebbinga	
ADDRESS	11897 County Road 87 SE	
CITY	Alexandria, MN 56308	
AIRPORT		
TELEPHONE	320-763-7803	
ASSOCIATED CITY	ALEXANDRIA	
DBA		
EMAIL	al@alexairapparatus.com	
WEB SITE	www.alexairapparatus.com	
COMPANY NAME	KBM Geospatial LLC	
CONTACT PERSON	Jim Megel	
ADDRESS	c/o Widseth Smith Nolting & Assoc 620 Fillmore Street	
CITY	Alexandria, MN 56308	
AIRPORT		
TELEPHONE	320-762-8149	
ASSOCIATED CITY	ALEXANDRIA	
DBA		
EMAIL	Jim.Megel@wsn.us.com	
WEB SITE		
COMPANY NAME	PAAP Drones LLC	
CONTACT PERSON	Christina Martinez	
ADDRESS	15909 Elmwood Way	
CITY	Apple Valley, MN 55124	

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## Flight Liability: MN Law

### ▶ Minn. Stat. § 360.012 subd. 3:

- “Flight in aircraft over the lands and water of this state is lawful, **unless at such low altitude as to interfere with the then-existing use to which the land or water, or the space above the land or water, is put by the owner, or unless so conducted as to be imminently dangerous or damaging to persons or property** lawfully in the land or water beneath...”

### ▶ Minn. Stat. § 360.012 subd. 4: Strict Liability

- “The owner of every aircraft which is operated over the lands or waters of this state is **absolutely liable for injury or damage to persons or property on the land or water beneath**, caused by the ascent, descent, or flight of the aircraft, or the dropping or falling of any object therefrom, whether such owner was negligent or not, unless the injury or damage is caused in whole or in part by the negligence of the person injured...”

## Things You Can't Do With Aircraft in MN

- ▶ Minnesota Statute §360.075 creates misdemeanor:
  - Operate over land or water without consent of owner
  - Operate without license and registration
  - Damages or interferes with other aircraft
  - Operates in a willful or wanton disregard for the safety of persons or property
  - Carries an explosive
  - Discharges a gun or weapon
  - Dropping objects
  - Endangering or killing wildlife
  - Etc...

## FAA vs Pirker



**Drones are Aircraft**



F16 vs Bird

## Civilian drone crashes into Army helicopter

By Danielle Furfaro, Larry Celona and Natalie Musumeci

September 22, 2017 | 2:48pm | Updated







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## Drone strikes commercial aircraft in Quebec

[Misha Gajewski](#), CTVNews.ca [@mishagajewski](#)

Published Sunday, October 15, 2017 11:46AM EDT

Last Updated Sunday, October 15, 2017 3:09PM EDT

- A Skyjet flight heading to Quebec City's Jean Lesage International Airport was struck by a drone on Oct. 12, according to Minister of Transport Marc Garneau.

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Fact Check › Horrors

## Grim Reaper

The tragic account of a spectator at a 1979 football game who was killed by a flying model lawnmower.

 David Mikkelson  
May 2, 2008

 SHARE



**Claim:** A spectator at a football game was killed by a flying model lawnmower.

## Enrique Iglesias cuts hand on drone during concert



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## Feaster Five drone crash under investigation

- **Device hit tree, runners during Thanksgiving road race**
  - By Gabriella Cruz [gcruz@eagletribune.com](mailto:gcruz@eagletribune.com)
  - Dec 1, 2015
- The drone clipped a tree branch shortly after the race began and, according to Andover Police Department Executive Officer Charles Heseltine, injured two male runners as it fell into the crowd.

## Man convicted in drone crash that injured woman during Seattle's Pride Parade

- Originally published January 13, 2017 at 5:42 pm Updated January 13, 2017
- By [Steve Miletich](#) Seattle Times staff reporter
- A woman was knocked unconscious when she was struck by the small drone as she watched the annual parade in 2015.
- Reckless endangerment carries a penalty of up to 364 days in jail and a \$5,000 fine. Skinner is scheduled be sentenced on Feb. 24.

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## Drone Rules are Changing Again



TRAVEL PILOT RESOURCES NEWS & VIDEOS TRAINING & SAFETY ADVOC.

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News & Videos > Drone fees, new rules expected

### DRONE FEES, NEW RULES EXPECTED FAA GAINS AUTHORITY OVER HOBBYISTS

October 15, 2018 | By Jim Moore

A new law signed Oct. 5 authorized FAA operations into 2023 and removed constraints on the regulation of recreational drones. It also set the stage for the agency to charge remote pilots for services, and for expanded commercial operations as well as drone enforcement.



Congress directed the FAA to adjust rules and restrictions on recreational drone use, while also taking steps to make commercial operations more viable and promoting safe integration of unmanned aircraft. AOPA photo.

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#### UNMANNED AIRCRAFT PROVISIONS IN FAA REAUTHORIZATION BILL

**Section 341 – Comprehensive Plan** -Codifies in title 49 the requirement in the 2012 FAA reauthorization Act that a comprehensive plan to safely accelerate the integration of civil unmanned aircraft systems into the national airspace system be developed.

**Section 342 – Update of Comprehensive Plan** - not later than 270 days after enactment, the comprehensive plan shall be updated to develop a concept of operations for the integration of unmanned aircraft into the national airspace system. FAA shall consult with the aviation industry in this process.

**Section 343 – Test Ranges** - requires the FAA to carry out and update a program for the use of test ranges to facilitate the integration of unmanned aircraft into the national airspace system. This program shall terminate on September 30, 2023.

**Section 344 – Arctic** - requires the FAA to develop a plan and initiate a process to designate permanent areas in the Arctic where small unmanned aircraft may operate 24 hours per day for research and commercial purposes.

**Section 345 – safety standards** - the FAA shall establish a process for accepting risk-based consensus safety standards and authorizing the manufacturer to self-certify that its small unmanned aircraft complies with these safety standards. This can take the place of current airworthiness certification and type certification requirements. A person cannot sell a small unmanned aircraft unless that aircraft complies with the consensus safety standards and procedures in this section, has received design and production approval from the FAA, the FAA determines that the unmanned aircraft may be operated without an airworthiness certificate or compliance with the consensus safety standards under this section, or the small unmanned aircraft is not capable of flying beyond the visual line of sight of the operator and such operation would not pose a risk to safety.

**Section 346 – public aircraft** - directs the FAA to issue guidance to expedite the process of authorizing flights by government unmanned aircraft and to provide guidance on a public agency's responsibilities when operating such aircraft. Allows a public safety agency to operate a small unmanned aircraft if the aircraft is operated at less than 400 feet.

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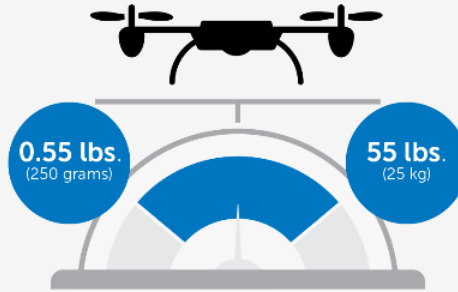
## Types of UAS Operations

1. Model aircraft (hobby or recreational **ONLY**)
2. Small Unmanned Aircraft Regulations: Federal Aviation Regulations Part 107
3. Section 333 Exemptions with Certificates of Waiver or Authorization (COA).
4. Designated Public Aircraft with a COA.



## Do I need to register my Unmanned Aircraft?

You need to register your aircraft if it weighs between **0.55 lbs.** (250 grams) and up to **55 lbs.** (25 kg)



<https://registermyuas.faa.gov/>

You will be subject to civil and criminal penalties if you meet the criteria to register an unmanned aircraft and do not register.

## Know Before You Fly

**DO:**  
FLY YOUR  
UNMANNED  
AIRCRAFT  
BELOW  
400 FEET



**DO:**  
FLY WITH  
LOCAL  
CLUBS



**DO:**  
INSPECT  
YOUR  
AIRCRAFT  
BEFORE  
YOU FLY



**DO:**  
TAKE A  
LESSON  
BEFORE  
YOU FLY

**DON'T:**  
FLY YOUR  
UNMANNED  
AIRCRAFT  
BEYOND  
LINE OF  
SIGHT



**DON'T:**  
FLY NEAR  
AIRPORTS  
OR ANY  
MANNED  
AIRCRAFT



**DON'T:**  
FLY NEAR  
PEOPLE  
or  
STADIUMS



**DON'T:**  
BE CARELESS  
or  
RECKLESS.  
YOU COULD  
BE FINED  
IF YOU  
ENDANGER  
PEOPLE  
OR OTHER  
AIRCRAFT



**DON'T:**  
FLY ANYTHING  
THAT WEIGHS  
MORE THAN  
55 LBS.

**DON'T:**  
FLY FOR  
PAYMENT  
or  
COMMERCIAL  
PURPOSES  
UNLESS  
SPECIFICALLY  
AUTHORIZED  
BY THE FAA

[www.faa.gov/uas](http://www.faa.gov/uas) • [www.knowbeforeyoufly.org](http://www.knowbeforeyoufly.org)



## Model Aircraft Requirements

- (a) The aircraft is flown strictly for hobby or recreational use;
- (b) The aircraft is operated in accordance with a community-based set of safety guidelines and within the programming of a nationwide community-based organization;
- (c) The aircraft is limited to not more than 55 pounds...;
- (d) The aircraft is operated in a manner that does not interfere with and gives way to any manned aircraft; and
- (e) When flown within 5 miles of an airport, the operator of the aircraft provides prior notice to the airport operator and the airport control tower...

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## Aircraft Registration

- In April of 2016, the FAA opened up the online registration process to all drone users.
- Commercial Operators are required to register each Drone with Make, Model, and Serial Number and each Drone is given an individual number.

## 14 CFR, Part 107

### Operation and Certification of Small Unmanned Aircraft Systems

- Became effective: August 29, 2016
- Replaces Many Section 333 Exemptions
- Creates a UAS pilot certificate

## FAA Part 107 Highlights

- Aircraft must weigh less than 55 pounds
- Visual Line-of-sight only (FPV not allowed)
- Cannot fly over non-participants
  - Covered structure/parked vehicle is OK
  - Moving vehicles are not
- Daylight only
- Maximum altitude of 400 feet or within 400 feet of a structure
- Remote Pilot-in-command must be Certificated (Minimum age is 16)



## Part 107 Waivers

The screenshot shows the FAA website's navigation and content for Part 107 waivers. At the top, the FAA logo and name are on the left, and navigation links for 'FAA Home', 'Jobs', 'News', 'About FAA', 'A-Z Index', and 'FAA for You ...' are on the right. Below this is a search bar. A secondary navigation bar lists categories: 'Aircraft', 'Airports', 'Air Traffic', 'Data & Research', 'Licenses & Certificates', 'Regulations & Policies', and 'Training & Testing'. The main content area is titled 'Request a Part 107 Waiver or Operation in Controlled Airspace' and includes a breadcrumb trail: 'FAA Home > Unmanned Aircraft Systems > Request a Part 107 Waiver or Operation in Controlled Airspace'. A yellow alert box states: 'Alert! FAA has streamlined the application process for part 107 waivers and airspace authorizations. All applications must now be submitted through FAA's DroneZone Portal. Before applying, review the step-by-step application process instructions. New applications will only be accepted through FAA's DroneZone Portal. Any previous applications submitted through the old web form are still being processed — do not resubmit waiver/authorization requests.' Below the alert, text reads: 'The FAA will issue waivers/authorizations to certain requirements of Part 107 if an applicant demonstrates they can fly safely under the waiver without endangering people or property on the ground or in the air.' A 'Top Tasks' sidebar lists: 'Getting started with your UAS', 'Register your Drone/Request a Waiver', 'Become a Drone Pilot', 'Learn Where to Fly', and 'Read Drone Safety Tips'. A 'More Information' sidebar lists: '14 CFR Part 107' and '§ 107.205 List of Regulations'. A left sidebar under 'Unmanned Aircraft Systems' lists various resources. The date '11/1/2018' is in the bottom left, and the page number '33' is in the bottom right.

## Types of Part 107 Waivers

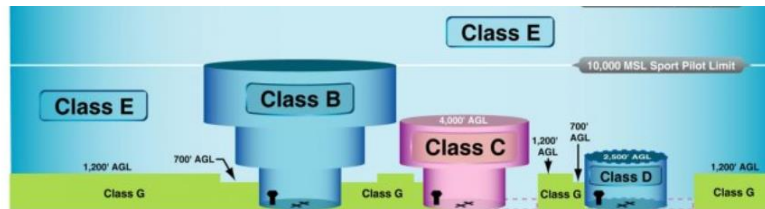
Determine the kind of waiver or authorization you need to perform your Part 107 operation. Common requests include the options below. View the complete [list of Part 107 regulations subject to waiver](#).

- Flying at night (§ 107.29)
- Flying directly over a person or people (§ 107.39)
- Flying from a moving vehicle or aircraft, not in a sparsely populated area (§ 107.25)
- Flying multiple aircraft with only one pilot (§ 107.35)
- Flying beyond the pilot's visual line-of-sight (§ 107.31)
- Flying above 400 feet (§ 107.51B)
- Flying near airports / in controlled airspace (§ 107.41)

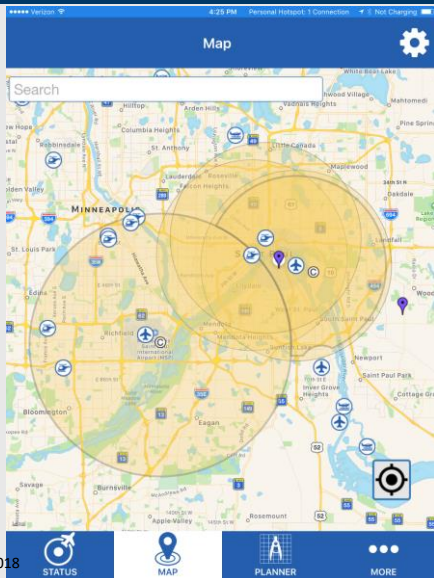
Be prepared by reviewing the [Part 107 regulations](#) to determine which regulation(s) you need waived and select **only** the ones you need to fly your operation.

## Certain Airspace Requires Permission

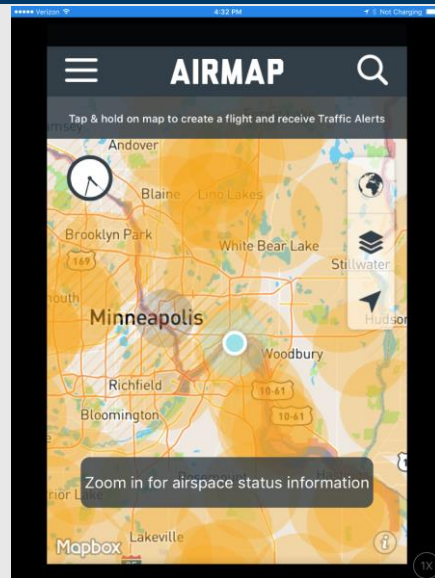
- Class B Airspace: Around MSP.
- Class C and D Airspace: Around Tower Controlled Airports.
- Within the Lateral boundaries of Class E Airspace designated for an airport.



## FAA and AirMap Apps



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## Airspace Authorizations through LAANC

### FAA UAS Data Exchange



The FAA UAS Data Exchange is an innovative, collaborative approach between government and private industry facilitating the sharing of airspace data between the two parties.

Under the FAA UAS Data Exchange umbrella, the agency will support multiple partnerships, the first of which is the Low Altitude Authorization and Notification Capability.

#### What is LAANC?

LAANC is the Low Altitude Authorization and Notification Capability, a collaboration between FAA and Industry. It directly supports UAS integration into the airspace.

It provides access to controlled airspace near airports through near real-time processing of airspace authorizations below approved altitudes in controlled airspace.



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## Operating your Drone under Part 107

- You will need to select the drone and sensors to do the job.
- You need to train pilots and use the drone often enough to keep them current.
- You have to comply with all the FAA, State and local requirements.

## 333 Exemption

- By law, any aircraft operation in the national airspace requires a certificated and registered aircraft, a licensed pilot, and operational approval. Section 333 of the FAA Modernization and Reform Act of 2012 (FMRA) (PDF) grants the Secretary of Transportation the authority to determine whether an airworthiness certificate is required for a UAS to operate safely in the National Airspace System (NAS).

## 333 Exemption

Exemption No. 11178

UNITED STATES OF AMERICA  
DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION  
WASHINGTON, DC 20591

In the matter of the petition of

**PICTURE FACTORY, INC.**

for an exemption from part 21; §§ 61.113(a) and (b); 61.133(a); 91.7(a); 91.9(b)(2); 91.103(b)(1); 91.119(c); 91.121; 91.151; 91.203(a) and (b); 91.405(a); 91.407(a)(1); 91.409(a)(2); and 91.417(a) and (b) of Title 14, Code of Federal Regulations

**Regulatory Docket No. FAA-2014-0794**

### GRANT OF EXEMPTION

By letter dated October 1, 2014, which referenced supplemental proprietary information to be submitted to the Federal Aviation Administration (FAA) by letter dated

## 333 Exemption Includes

- Crew Requirements
- Operating Restrictions
- Mechanical Requirements
- Lost Link/Emergency Actions
- Record Keeping
- Register with FAA
- Notice Requirements

## Certificate of Authorization

FAA FORM 7711-1 UAS COA Attachment  
2015-CSA-11178-48-333E

Page 1 of 5

DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION	
CERTIFICATE OF WAIVER OR AUTHORIZATION	
ISSUED TO	Picture Factory, Inc., FMRA Section 333 Exemption 11178
	8362 Tamarack Village #119-155 Woodbury, MN 55125
	This certificate is issued for the operations specifically described hereinafter. No person shall conduct any operation pursuant to the authority of this certificate except in accordance with the standard and special provisions contained in this certificate, and such other requirements of the Federal Aviation Regulations not specifically waived by this certificate.
OPERATIONS AUTHORIZED	Operation of the K130 Octocopter Unmanned Aircraft System (UAS) in E and G airspace below 400 feet Above Ground Level (AGL) in the vicinity of Virginia, MN under the jurisdiction of Duluth Terminal Radar Approach Control (DLH) for the purpose of aerial filming and video. See attachment 1.
LIST OF WAIVED REGULATIONS BY SECTION AND TITLE	NA
<b>STANDARD PROVISIONS</b>	
1. A copy of the application made for this certificate shall be attached and become a part hereof.	
2. This certificate shall be presented for inspection upon the request of any authorized representative of the Federal Aviation Administration or of any State or municipal official charged with the duty of enforcing local laws or	

## Operating as a Public Aircraft

- You will need to select the drone and sensors to do the job.
- You need to train pilots and use the drone often enough to keep them current.
- You have to get a COA for your operations from the FAA.

## FAA Public Safety Guidance

### Unmanned Aircraft Systems

Getting Started

Beyond the Basics

Where to Fly

Frequently Asked Questions

Programs, Partnerships and Opportunities

Research & Development

Resources

Webinar Series

UAS Regulations & Policies

Manufacturers Tool Kit

Law Enforcement

Operate a Drone/Start a Drone Program

Handling Sightings and Reports

Public Safety Toolkit

UAS Sightings Report

Event Archive

FOIA Responses

Contact Us

Report an Accident

Request a Part 107 Waiver or Operation in Controlled

FAA Home » Unmanned Aircraft Systems » Resources » Law Enforcement

### Law Enforcement and Public Safety

For law enforcement and public safety agencies, drones can be both a benefit and a challenge. While drones can serve as a useful tool, these agencies also have an important role in protecting the public from unsafe and unauthorized drone operations. This information will help law enforcement and public safety professionals understand safe drone operations and their authority.



**Operate a Drone, Start a Drone Program**

**Understand Your Authority: Handling Sightings and Reports**

**Access Our Public Safety Toolkit**

#### 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



**Waiver Outreach Webinar Series**

#DroneWaiver

**Part 107 Knowledge Test Prep**



## Local Drone Ordinances

### City of Newton's Drone Ordinance Overturned by Federal Judge

By [Linn Foster Freedman](#) and [Matthew Rizzini](#) on September 25, 2017 Posted in [Drones](#)

- Last week, a federal judge in Massachusetts ruled that the City of Newton's drone ordinance, which attempted to regulate drone flights in the airspace over Newton, Massachusetts could not be enforced by the municipality because it is pre-empted by federal law. In December of 2016, the city passed an ordinance that required drone operators to register their drones, banned unmanned drone flights under 400 feet, and banned flights over private and public property without permission from the landowner.

## Local Ordinances

- Takeoffs and Landings: While flight is governed by the FAA, the surface used for takeoff or landing is not. Minnesota law requires a person to have the consent of the property owner.
- Privacy laws apply to drones.
- Peeping Tom laws apply to drones.
- Nuisance laws can be written to specifically address drones.
- Careless and Reckless operation is a violation of FAA regulations and Minnesota Statutes. The FAA says that if you see someone doing something that violates FAA regulations, call local law enforcement. The definition of careless and reckless is in the eye of the beholder.

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## Local Drone Ordinances on MnDOT Aeronautics Drone Page

### Information for UAS operators

When you fly UAS in the United States, it is your responsibility to understand and abide by the rules. The rules for operating UAS depend on your intended use.

#### Where can I fly?

Apps like [B4Ufly](#) and [AirMap](#) help users to identify airports near them. The best location for contact information for the airport operator is [Airport IQ 5010](#).

Recreational UAS operators ([14 CFR, Part 101](#) users) are required to notify the airport operator and air traffic control before flying within five miles of an airport. They are also restricted to operating at altitudes less than 400 feet and within the line of sight of the operator.

Though not required, it is good practice for commercial UAS operators ([14 CFR, Part 107](#) users) to contact affected airports when flying.

### Commercial operators

The Minnesota Rules define a [commercial operation](#) as any operation of an aircraft for compensation or hire, or any services performed incidental to the operation of any aircraft for which a fee is charged or compensation received. A photographer using a UAS to take wedding pictures for a client is a commercial operator even if they don't charge extra for the use of the UAS.

Minnesota law requires commercial operators to obtain a commercial operations license before they advertise, represent, or hold themselves out as giving or offering to provide this service. To get a commercial operations license the applicant must submit an application along with a certificate of insurance that meets the requirements of [Minnesota Rule 8800.3200, Subp. 15](#).

The licensing fee is \$30 a year and we do not have a method for accepting electronic payments. Learn more about the [licensing process and access forms](#).

### Email updates

News and events about unmanned aircraft systems in Minnesota



Sign up for UAS email updates

### UAS contacts

MnDOT - Office of Aeronautics  
222 East Plato Boulevard  
St. Paul, MN 55107-1618

Aircraft Registration Unit  
651-234-7201  
[karen.lager@state.mn.us](mailto:karen.lager@state.mn.us)  
[jana.thompson@state.mn.us](mailto:jana.thompson@state.mn.us)

Commercial Operations  
651-234-7232  
[judy.meyers@state.mn.us](mailto:judy.meyers@state.mn.us)

### UAS resources

- [Academy of Model Aeronautics](#)
- [Know Before You Fly](#)
- [Aircraft Owners and Pilots Association](#)
- [Commercial operators](#)
- [Government operators](#)
- [Model aircraft operators](#)
- [UAS for communities](#)

### Local drone ordinances

- [Arlington](#)
- [Chaska](#)
- [Pakota County](#)

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Optional Tagline Goes Here | [mndot.gov/](http://mndot.gov/)

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## Help us to add to the list

- If you know of other local drone ordinances, please send us the reference and we will add them to our list.

### Local drone ordinances

- [Arlington](#)
- [Chaska](#)
- [Dakota County](#)
- [Eagan](#)
- [Minneapolis](#)
- [National Parks](#)
- [St. Bonifacius](#)
- [Three Rivers](#)
- [University of Minnesota](#)

## Unmanned Aircraft Systems

[Getting Started](#)

[Beyond the Basics](#)

[Where to Fly](#)

[Airspace Restrictions](#)

[No Drone Zone](#) →

[B4UFLY](#)

[Frequently Asked Questions](#)

[Programs, Partnerships and Opportunities](#)

[Research & Development](#)

[Resources](#)

[Contact Us](#)

[FAA Home](#) ▶ [Unmanned Aircraft Systems](#) ▶ [Where to Fly](#) ▶ [No Drone Zone](#)

## No Drone Zone

The FAA is leading a public outreach campaign to promote safe and responsible use of unmanned aircraft systems.

We are offering a free digital toolkit with outreach materials to federal, state, and other partners to educate unmanned aircraft operators that flying in certain areas is prohibited. This toolkit includes No Drone Zone signage for any medium, including print and web.

[Download the No Drone Zone Digital tool kit \(PDF\)](#)



## 2016 FAA Extension Bill: H. R. 636—17

### **“§ 46320. Interference with wildfire suppression, law enforcement, or emergency response effort by operation of unmanned aircraft**

- “(a) IN GENERAL.—Except as provided in subsection (b), an individual who operates an unmanned aircraft and in so doing knowingly or recklessly interferes with a wildfire suppression, law enforcement, or emergency response effort is liable to the United States Government for a civil penalty of not more than \$20,000.

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## Flight Liability: FAA Penalties

- Civil penalties up to \$27,500
- Criminal penalties including fines up to \$250,000 and/or imprisonment for up to three years



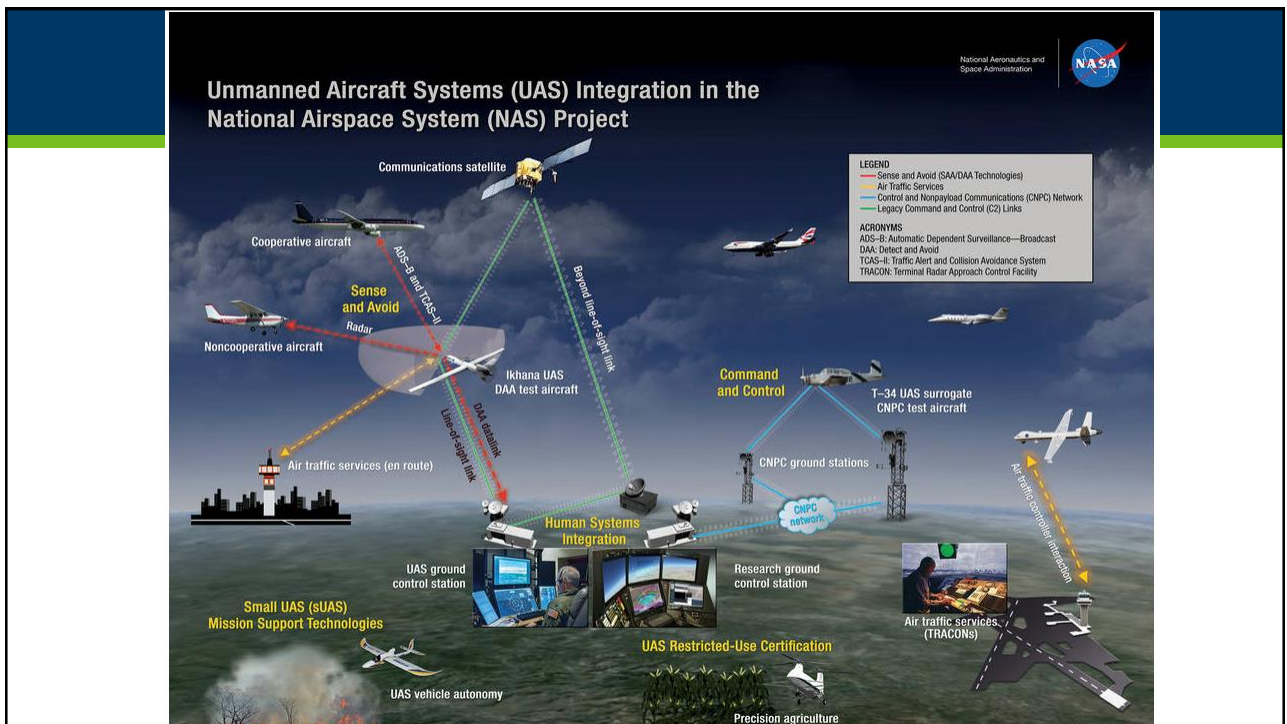
## Kansas to Use AirMap in Pioneering Effort at UTM

The KDOT-AirMap collaboration will lay the foundation for a statewide UTM infrastructure by deploying technology capable of:


- Delivering safety-critical information from state and local agencies to drones for situational awareness and flight planning
- Facilitating collaboration, communication and data exchange between state and local authorities and drones and their operators
- Fostering public awareness about drone regulations and airspace requirements
- Automating airspace notification and authorization at Kansas airports
- Demonstrating sophisticated solutions that safeguard public safety and personal privacy, including technology for geofencing and remote identification
- Enabling high-scale and complex operations beyond visual line of sight

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**Through 2036, large unmanned aircraft are expected to drive nearly \$150 billion in total spending and sustain up to 60,000 R&D, manufacturing, and services jobs annually, according to Avascent and AIA analysis.**



**THINK BIGGER**



**Large Unmanned Systems and the Next Major Shift in Aviation**

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*THIS ISN'T STARCRAFT—*

## DOD successfully tests terrifying swarm of 104 micro-drones

Dispersed from two F-18s, drones collaborated in "missions" at China Lake facility.

SEAN GALLAGHER - 1/12/2017, 10:58 AM



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## Post-Test

- I got a drone for Christmas and I want to fly it in my backyard and I'm going to stay below the roof level of my house. Can I legally make this flight?
- I got some really cool pictures with my drone and the local TV station wants to use them on the news. Does this make me a commercial operator? Even if they don't pay me?
- We are working a crash site and this guy has his drone buzzing around. I want him to stop, but can I legally require him to land that annoying thing?
- I'm operating my drone for the police department. What regulation exempts me from having to comply with MnDOT and FAA requirements?

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## Questions?

**Rick Braunig**

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651-234-7230

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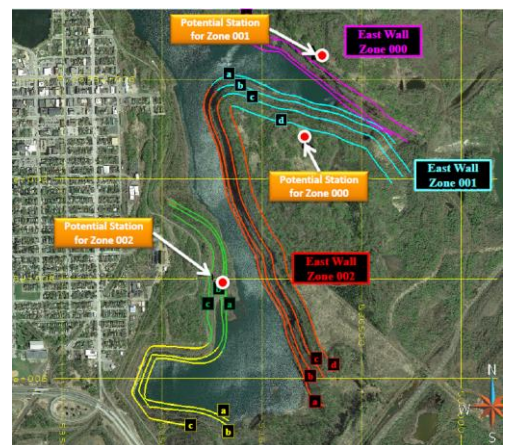
## MnDOT's Criteria for using Drones

- The use will give us better data than we have been able to get.
- There is a cost savings in using the drone over our current methods.
- Using the drone reduces the risk to personnel.



## Mission Planning

- What flight paths will be flown?
- Where are the takeoff and Landing sites?
- Do you have the Property Owner's Permission?
- What Airspace is involved?
- Are there Temporary Flight Restrictions?
- Other Permissions?
- What about the Communications Plan?



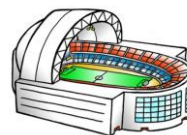
## Things to consider: Safety

- **SAFETY!!!** You have to consider an area 360° around your operation, not just the object of the UAS flight.
  - What do the rules allow?
  - How will you stay in compliance with the rules?
  - Do you need an exception?
  - Apply for a COA with sufficient lead time.



## Things to consider: Location

- Is your operation near an **AIRPORT**?
- Is your operation in or around a **NATIONAL PARK**?
- Is your operation around a **HOSPITAL**?
- Is your operation around a **STADIUM**?





## Risk Assessment

- What are examples of acceptable risks?
- What are examples of unacceptable risks?
- What mitigations are available?
- If using a contractor, how do you engage them in risk management?
- If you have an incident/accident, how will you manage it?

Figure A-2. Safety Risk Matrix Examples

Severity Likelihood	←		Higher Lower	→
↑	Yellow	Yellow	Red	Red
	Green	Yellow	Yellow	Red
More Less	Green	Green	Yellow	Yellow
↓	Green	Green	Green	Yellow

Labels in matrix: "Acceptable with Mitigation" (diagonal), "Acceptable" (bottom-left), "Unacceptable" (top-right).

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## Things to consider: Public Perception

- Will this make the news because:
  - We advertise our cutting edge programs.
  - The neighbors are complaining that we are spying on them.
  - We had a crash and it involved ...
- How will we protect private data?
  - If we are collecting data, how do we keep from getting pictures of the public?
  - If we do get the public, how do we address the privacy issues involved?





## Mission Qualifications

- Will you have several different missions?
- Will different missions use different UAS?
- How will you document the processes for different missions?
- How will contractors be selected?
- How will pilots get qualified?
- Will the crew be required to get qualified?

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## The Aircraft

- No Airworthiness Certificate under 55 Pounds but:
  - Aircraft have scheduled maintenance inspections. What is being done for routine maintenance?
  - Critical aircraft parts are removed before failure. What are your critical parts? What is their expected lifespan?
  - How will you track hours on aircraft? on components?
  - Who does the maintenance and how is it documented?
  - A Preflight Inspection is required:
1. Visual condition inspection of the UAS components;
  2. Airframe structure (including undercarriage), all flight control surfaces, and linkages;
  3. Registration markings, for proper display and legibility;
  4. Moveable control surface(s), including airframe attachment point(s);
  5. Servo motor(s), including attachment point(s);
  6. Propulsion system, including powerplant(s), propeller(s), rotor(s), ducted fan(s), etc.;
  7. Verify all systems (e.g., aircraft and control unit) have an adequate energy supply for the intended operation and are functioning properly;
  8. Avionics, including control link transceiver, communication/navigation equipment, and antenna(s);
  9. Calibrate UAS compass prior to any flight;
  10. Control link transceiver, communication/navigation data link transceiver, and antenna(s);
  11. Display panel, if used, is functioning properly;
  12. Check ground support equipment, including takeoff and landing systems, for proper operation;
  13. Check that control link correct functionality is established between the aircraft and the CS;
  14. Check for correct movement of control surfaces using the CS;
  15. Check onboard navigation and communication data links;
  16. Check flight termination system, if installed;
  17. Check fuel for correct type and quantity;
  18. Check battery levels for the aircraft and CS;
  19. Check that any equipment, such as a camera, is securely attached;
  20. Verify communication with UAS and that the UAS has acquired GPS location from at least four satellites;
  21. Start the UAS propellers to inspect for any imbalance or irregular operation;

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## Guessing when your drone will die

- the DJI Inspire 1 remains one of the most popular unmanned aircraft systems on the market for photography and videography, and, like all quadcopters, it relies on four motors, each with its own electronic speed controller, wiring to connect those components to the rest of the system, and a propeller, all of which represent single points of potential failure. Each electric motor is indispensable—the aircraft will fall out of control if any motor fails in flight—and few of the many such motors tracked to date have demonstrated longevity beyond 200 hours, on average requiring replacement after about 30 or 40 hours of flight time, said Tony Pucciarella, [director of operations](#) at the University of Maryland's UAS Test Site and the founder of [AlarisPro](#), an online service for unmanned aircraft fleet management and predictive maintenance.

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## The Pilot

- A Pilot Certificate is required but no demonstration of Pilot Skill. How will you check out your pilot's knowledge and ability?
- Will you require recurrent training? Recertification on a regular basis?
- Different UAS have different features, how familiar is the pilot with this UAS?
- Manned Aircraft Pilots are required to make 3 takeoffs and landings every 90 days to carry passengers, how long has it been since this pilot's last flight?
- Pilots must not operate with a medical condition that could interfere with safety. What do you know about the health of your pilot?
- The pilot will interact with the crew. Do they have a process for crew coordination?

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## The Crew

- What training has the crew been given?
- How will the pilot and crew interact? If using radios, what do you do if a radio fails?
- Where will the crew be positioned and what are their responsibilities?
- What if the pilot and the crew disagree?
- How many people will be on the crew?
- Will you have a safety observer as well?

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## The Data

- Will you have a data standard?
  - Can you share the data across agencies?
  - Who evaluates the data?
  - How are improvements made?
  - How long is the data kept?
  - What are the privacy concerns?
- 
- How is aircraft and pilot data recorded?
  - How is aircraft data used for maintenance?


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# Program Oversight

- Who can authorize UAS flights?
- What criteria do you use to determine if a UAS flight is justified?
- How are Pilots/Crew designated?
- How is safety oversight provided?
- How are UAS and sensors bought?
- How are new missions vetted?
- Is senior leadership in the loop?

**MnDOT Unmanned Aircraft System (UAS) Use Application**



**Your Information**

Name	
Office/District	
Work Phone	
E-Mail Address	

**Drone Information**

Are you purchasing a drone or using a contractor? Purchasing  Using a Contractor

What is your expected date of operation?

**Contractor Information**

If you are using a contractor please provide the following information:

Name of Contractor	
Street Address	
City ST ZIP Code	
Work Phone	
Email address	
FAA registration number	

**Use Information**

How will you use the drone? Please describe:

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# What if you have a Crash?

- What steps need to be taken immediately?
- Who in your organization needs to know?
- What information needs to be gathered?
- How do you interact with the public/press?
- What if you have a flyaway?
- Do you have an incident plan?

sUAS Accident Report

1. sUAS Remote PIC name and contact information			
2. sUAS Remote PIC's Airman Certificate Number			
3. sUAS FAA registration number			
4. Location of the Accident			
5. Date of the Accident	6. Time of the Accident		
7. Person(s) injured and extent of injury			
8. Property damaged and Extent of damage			
9. Description of what happened			

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## Best Practices

- Maintain controls over the use of Drones.
- Treat them like Aircraft.
- Require a Flight Plan for every flight.
- Require a Safety Plan for every operation that identifies and mitigates the risks.
- Provide notice to the public and anyone in your organization that the public may call.

## Battery Safety



## Boeing's Aurora partners with maker of nickel-size drone module

By Luke Geiver | January 30, 2018

[The nickel-size radio frequency control module will help small drones detect the distance and speed of obstacles.](#)

PHOTO: AURORA FLIGHT SCIENCES

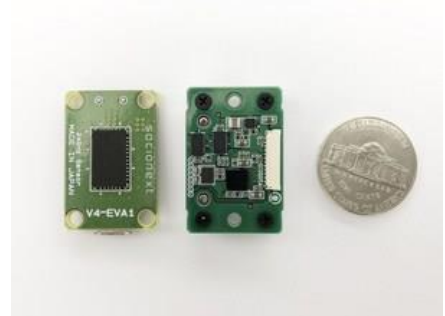
•Aurora Flight Sciences is adding small drone collision avoidance technology to its suite of unmanned aircraft systems technology. Through a collaboration with California-based Socionext Inc., the Virginia-based aerospace technology developer is now working to streamline a radar flight control module the size of a nickel coin.

The RFCM can help protect consumer drones from encountering collisions during flight. John Langford, CEO of Aurora, said the partnership will help develop an excellent technology. In 2016, Socionext first unveiled its RFCM module at an industry event.

Tsutomu Nozaki, chief marketing officer of the engineering company, said the partnership will help bring the RFCM to drones used for commercial operations, including surveillance and communication, mission critical response and other experimental or exploration applications.

Comprised of a single-chip 24GHz radar with range measurement software, the module can detect multiple objects in open spaces and target distance and speed, according to Aurora. "The RFCM provides distance, warning and braking signals to the flight controller through a simple interface, allowing for integration on a wide range of drone products," Socionext said. When

installed, the RFCM acts to prevent head-on collisions with everyday obstacles



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