

Moderator: Keith J. Thibault, Fall River Community Media

Presenters: Tom Bolus, Plymouth Area Community

Television

Ryan Webber, Falmouth Public Schools Educational Access

#### **About Us**

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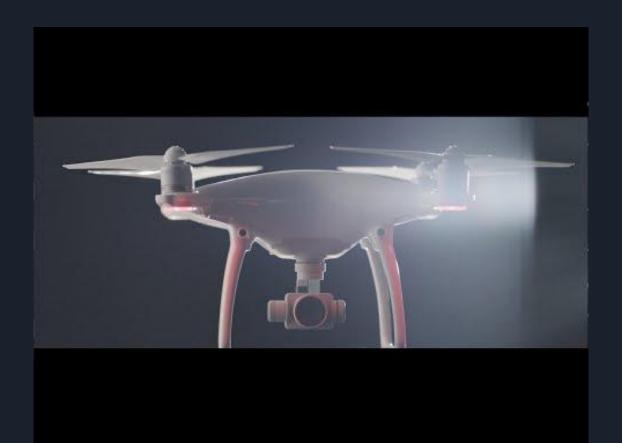
\*IANAL (I am Not A Lawyer)
All rules subject to change

# Topics

- What is a UAV?
- What are the advantages to using UAVs to tell your story?
- What should you look for in a UAV?
- What steps do you need to take to legally fly UAVs?
- What are practical, ethical, and privacy issues concerning drones?

# What is a drone?

#### Not a drone



#### Drone



#### Drone



#### (Not Quite A) Drone



# UAV/UAS Unmanned Aerial Vehicle / System

#### Unmanned Aerial Vehicle (Quadrocopter)



# Unmanned Aerial Vehicle (Hexacopter)



#### UAV (Hexakaidecacopter)



#### Civilian UAV Uses

- Inspection and monitoring
- Surveying and mapping
- Agriculture
- Search and rescue
- Delivery
- Radio relay
- Video production

#### How Does a Drone Help you Tell Your Story?



## How Does a Drone Help you Tell Your Story?



#### How Does a Drone Help you Tell Your Story?



#### **UAV** Considerations

- Gimbal Stabilizer
- Camera resolution / sensor size
- Camera tilt / pan
- Transmitter distance
- Controller / viewer
- Battery flight time / max airspeed
- Object detection / assistive flying
- Warranty / support

#### Hobbyist UAVs - Holy Stone HS170 Predator



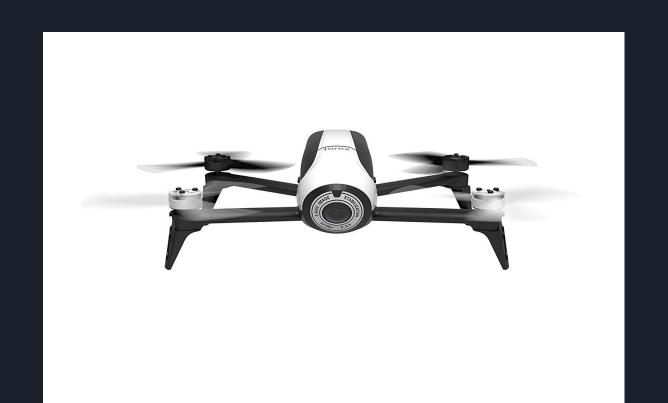
#### Hobbyist UAVs - Syma X5C Quadcopter



## Hobbyist UAVs Footage



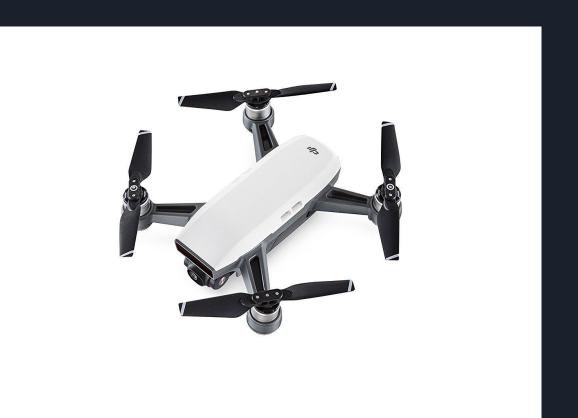
#### Starting UAVs - Parrot BeBop 2



#### Starting UAVs - DJI Phantom 3



## Starting UAVs - DJI Spark



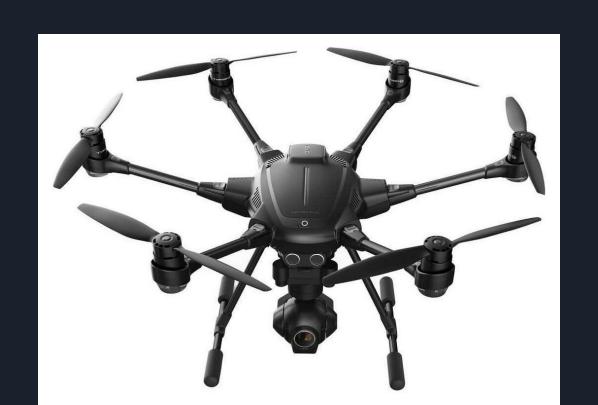
## Starting UAVs - DJI Mavic Pro



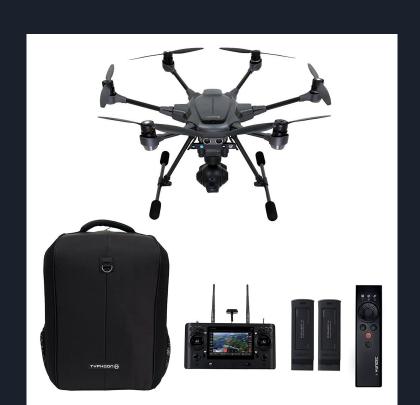
## Starting UAVs - GoPro Karma



#### Starting UAVs - Yuneec Typhoon 4K



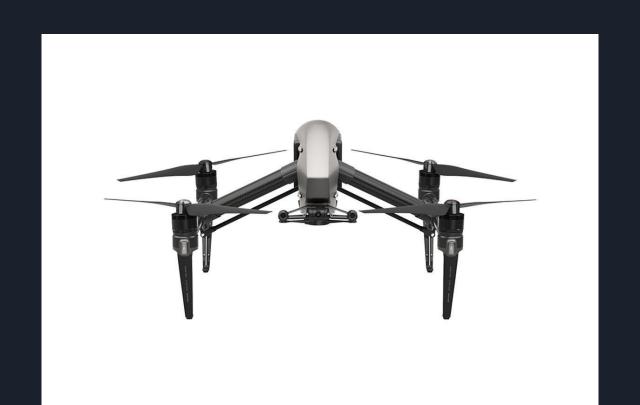
#### Professional UAVs - Yuneec Typhoon H



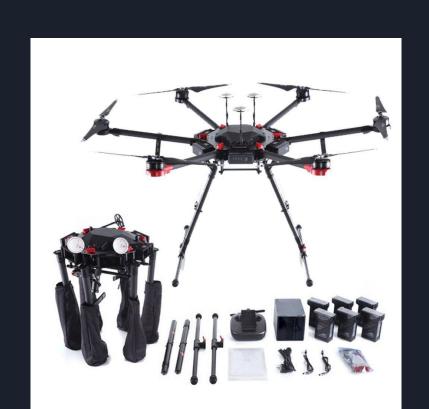
#### Professional UAVs - DJI Phantom 4 Pro



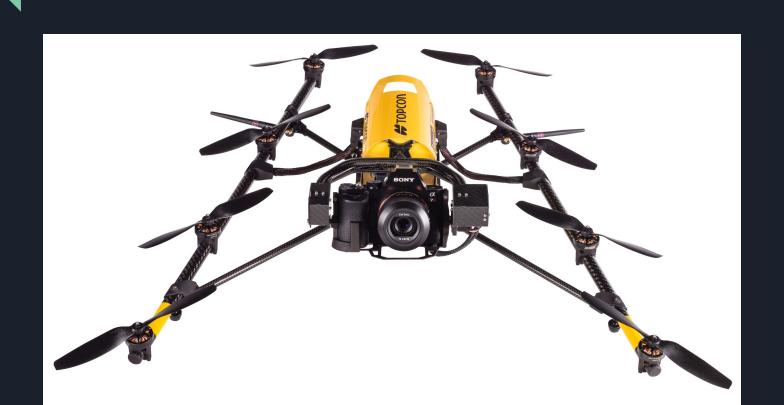
## Professional UAVs - DJI Inspire 2



#### Sky's the Limit UAVs - Matrice 200 / 600



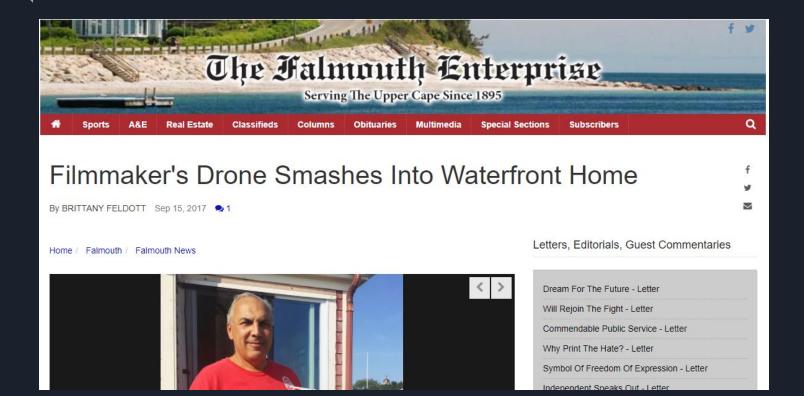
#### Sky's the Limit UAVs - Intel Falcon 8+



#### Sky's the Limit UAVs - DroneVolt Janus 360 V2



#### How are UAVs safely operated?



#### How are UAVs safely operated?

#### Civilian Drone Crashes Into a US Army Helicopter (nypost.com)



270

Posted by EditorDavid on Sunday September 24, 2017 @03:34PM from the Blackhawk-up dept.

An anonymous reader quotes the New York Post.

It was nearly Black Hawk down over Staten Island -- when an Army chopper was struck by an illegally flying drone over a residential neighborhood, authorities said Friday. The UA60 helicopter was flying 500 feet over Midland Beach alongside another Black Hawk, when the drone struck the chopper at around 8:15 p.m. Thursday, causing damage to its rotor blades. The uninjured pilot was able to land safely at nearby Linden Airport in New Jersey... "Our aircraft was not targeted, this was a civilian drone," said Army Lieutenant Colonel Joe Buccino, the spokesman for the 82nd Airborne... "One blade was damaged [and] dented in two spots and requires replacement and there is a dented window"... The NYPD and the military are investigating -- but no arrests have been made.

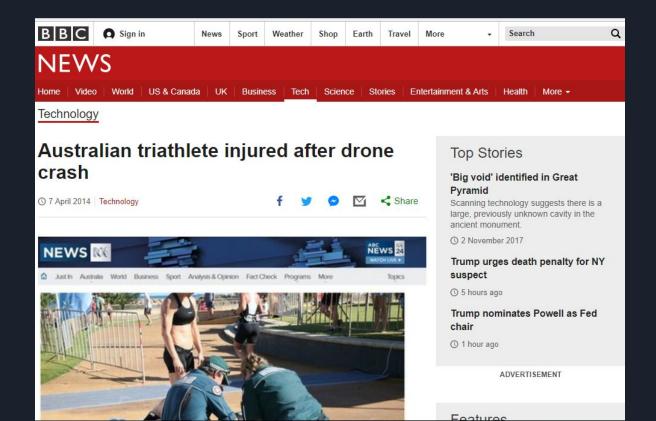
The same day a federal judge <u>struck down an ordinance banning drone flights</u> over private property that had been passed by the city of Newton, Massachusetts. But local law enforcement warned that "an out of control helicopter could have crashed into residential homes causing numerous injuries and even fatalities," while the *Post* reports that drones have also crashed into a power plant and into the 40th floor of the Empire State Building.

"In February, a GoPro drone crashed through a Manhattan woman's 27th floor window and landed just feet away from her as she sat in her living room."





#### How are UAVs safely operated?



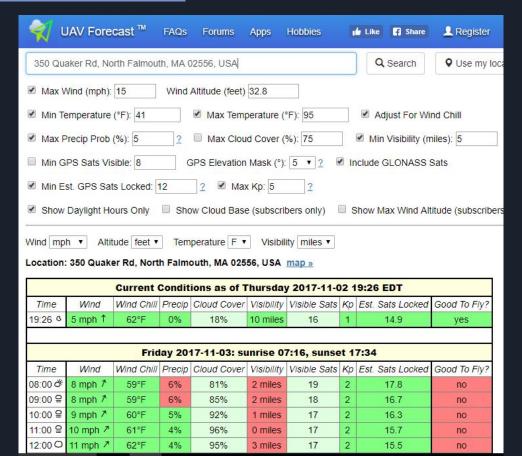
## Learning to operate - start indoors



## Preflight checklist

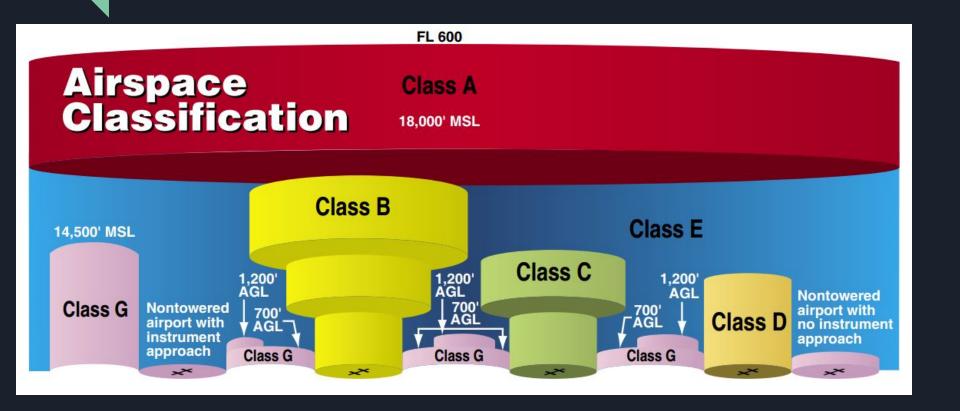
		Nua Fliabt Chaald		
	11	Pre-Flight Checkl	IST	
Pilot	In Command:	FAA Reg. No.:	Date:	
Obs	erver (Optional):	Location:		
JAS	Model:			
DJI P	hantom 3 Pro			
Purp	ose of Flight (Check 1):	Recreation Commercial (1)	☐ SAR <sup>(2)</sup> ☐ Other (b	escribe)
Auth	orized by:		Title:	
A. F	Pre-Start Checklist Important: Complete all check list its problem before continuin	ems in the order they are presented. If you cannot	Title:	rect the
A. F	Pre-Start Checklist Inportant: Complete all check list ite		ot check off an item STOP! and cor	
No.	Pre-Start Checklist  mportant: Complete all check list ite  problem before continuin  Item	1 <b>6</b> -	ot check off an item STOP! and cor	
A. F	Pre-Start Checklist  nportant: Complete all check list ite problem before continuin	Acceptable Co	ot check off an item <b>STOP!</b> and cor <b>ndition</b> horized	
No.	Pre-Start Checklist  mportant: Complete all check list ite  problem before continuin  Item	Acceptable Co Unrestricted airspace or flight aut	nt check off an item <b>STOP!</b> and cor <b>ndition</b> horized led flight path identified	
No.	Pre-Start Checklist mportant: Complete all check list its problem before continuin Item  Airspace	Acceptable Co Unrestricted airspace or flight aut Potential obstructions near intend	nt check off an item <b>STOP!</b> and cor <b>ndition</b> horized led flight path identified	
No. 1	Pre-Start Checklist Important: Complete all check list its problem before continuin Item  Airspace Weather	Acceptable Co Unrestricted airspace or flight aut Potential obstructions near intend Visibility >= 3 miles/500 ft., Wind <	ndition horized led flight path identified (=15mph, Precip None	Sat.
No. 1 2 3	Pre-Start Checklist Important: Complete all check list its problem before continuin Item  Airspace  Weather SUAS Airframe/Props	Acceptable Co Unrestricted airspace or flight aut Potential obstructions near intend Visibility >= 3 miles/500 ft., Wind < No structural defects visible	ndition horized led flight path identified e=15mph, Precip None ess than 75%	
No. 1 2 3 4	Pre-Start Checklist Important: Complete all check list its problem before continuin Item  Airspace  Weather SUAS Airframe/Props SUAS Battery	Acceptable Co Unrestricted airspace or flight aut Potential obstructions near intend Visibility >= 3 miles/500 ft., Wind < No structural defects visible Sufficient for intended flight, not l	ndition horized led flight path identified e=15mph, Precip None ess than 75%	
No. 1 2 3 4 5	Pre-Start Checklist Important: Complete all check list its problem before continuin Item  Airspace  Weather SUAS Airframe/Props SUAS Battery Controller Battery	Acceptable Co Unrestricted airspace or flight aut Potential obstructions near intend Visibility >= 3 miles/500 ft., Wind < No structural defects visible Sufficient for intended flight, not I Sufficient for intended flight, not I	ndition horized led flight path identified =15mph, Precip None ess than 75% ess than 75%	
No. 1 2 3 4 5 6	Pre-Start Checklist Important: Complete all check list its problem before continuin Item  Airspace  Weather SUAS Airframe/Props SUAS Battery Controller Battery Display Device Battery	Acceptable Co Unrestricted airspace or flight aut Potential obstructions near intend Visibility >=3 miles/500 ft., Wind <li>No structural defects visible Sufficient for intended flight, not I Sufficient for intended flight, not I Sufficient for intended flight</li>	ndition horized led flight path identified =15mph, Precip None ess than 75% es available for flight	
No. 1 2 3 4 5 6 7	Pre-Start Checklist Important: Complete all check list its problem before continuin Item  Airspace Weather SUAS Airframe/Props SUAS Battery Controller Battery Display Device Battery Memory Card	Unrestricted airspace or flight aut Potential obstructions near intenc Visibility >=3 miles/500 ft., Wind < No structural defects visible Sufficient for intended flight, not l Sufficient for intended flight, not l Sufficient for intended flight, not l Installed, sufficient memory space	ndition horized led flight path identified =15mph, Precip None ess than 75% es available for flight	

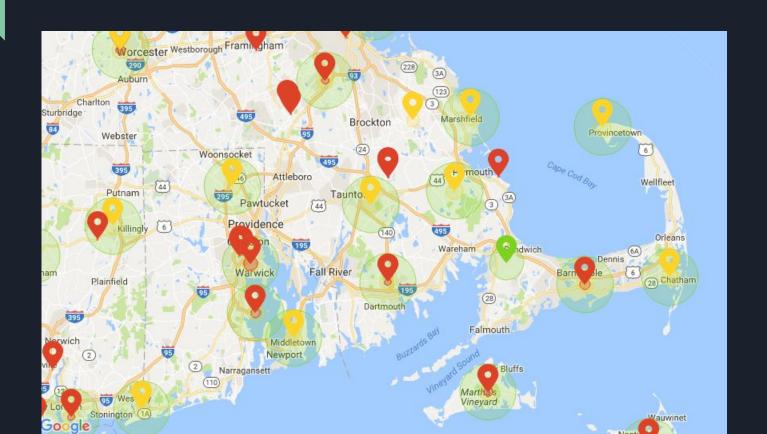
#### uavforecast.com

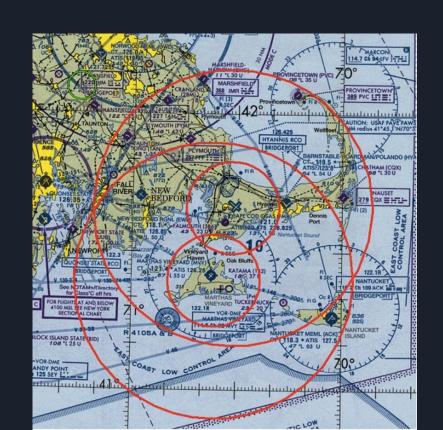


	Fly for Fun	Fly for Work
Pilot Requirements	No pilot requirements	Must have Remote Pilot Airman Certificate Must be 16 years old Must pass TSA vetting
Aircraft Requirements	Unless exclusively operated in compliance with Section 336 of Public Law 112-95 (Special Rule for Model Aircraft), the aircraft must be registered if over 0.55 lbs.	Must be less than 55 lbs.  Must be registered if over 0.55 lbs. (online)  Must undergo preflight check to ensure UAS is in condition for safe operation

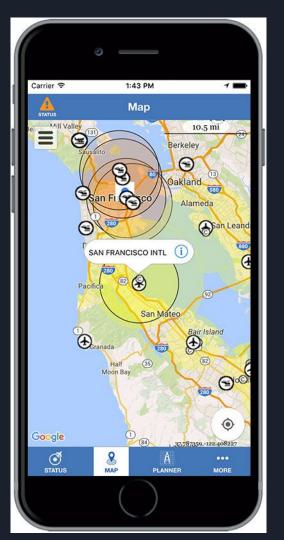
	Fly for Fun	Fly for Work
Location Requirements	5 miles from airports without prior notification to airport and air traffic control	Class G airspace*







# B4Ufly



#### Where not to fly

- Security Sensitive Airspace Restrictions
- Temporary Flight Restrictions
- Restricted or Special Use Airspace
- Stadiums and sporting events
- Wildfires
- Airports

1	Fly for Fun	Fly for Work
Operating Rules	Must ALWAYS yield right of way to manned aircraft Must keep the aircraft in sight (visual line-of-sight) UAS must be under 55 lbs. Must follow community-based safety guidelines Must notify airport and air traffic control tower before flying within 5 miles of an airport	Must keep the aircraft in sight (visual line-of-sight)* Must fly under 400 feet* Must fly during the day* Must fly at or below 100 mph* Must yield right of way to manned aircraft* Must NOT fly over people* Must NOT fly from a moving vehicle*

	Fly for Fun	Fly for Work
Example Applications	Educational or recreational flying only	Flying for commercial use (e.g. providing aerial surveying or photography services) Flying incidental to a business (e.g. doing roof inspections or real estate photography)
Legal or Regulatory Basis	Public Law 112-95, Section 336 – Special Rule for Model Aircraft FAA Interpretation of the Special Rule for Model Aircraft	Title 14 of the Code of Federal Regulation (14 CFR) Part 107

#### Basic UAV Operation - Reporting

The FAA requires notification of certain sUAS accidents. The applicable FAA regulation states:

§ 107.9 Accident Reporting. No later than 10 days after an operation that meets the criteria of either paragraph (a) or (b) of this section, a remote pilot in command must report to the Federal Aviation Administration in a manner acceptable to the Administrator, any operation of the small unmanned aircraft involving at least:

- Serious injury to any person or any loss of consciousness; or
- b. Damage to any property, other than the small unmanned aircraft, unless one of the following conditions is satisfied:
  - The cost of repair (including materials and labor) does not exceed \$500; or
  - The fair market value of the property does not exceed \$500 in the event of total loss.

### **Basic UAV Operation - Reporting**

* First name:		
* Last name:		
* Phone:	(nnn) nnn-nnnn	
Email address:		
* FAA Airman Certific	rate ————	
Airman Certificate no.:		
	None	
	Unknown	
A CONTRACTOR OF THE PROPERTY O		
* sUAS Registratio	1	
ircraft Registration no.:		
	None	
	Unknown	



- 16 year old +
- Aeronautical knowledge test
  - First-time pilots
  - Existing pilots

- Contact test center
- Background check
- \$150
- 2 hours
- 80 questions
- Need to get 70%
- Vaild for 2 years

#### Part 107 Certification - Connecticut

Site ID	Site	Address	Phone			
LAS06802	**EXECUTIVE AIR SERVICES	53 MIRY BROOK ROAD	(203) 778-1150			
ABS06501	**ROBINSON AVIATION, INC.	50 THOMPSON AVENUE	(203) 467-9555			
ABS06102	**AMERICAN FLIGHT ACADEMY	20 LINDBERGH DRIVE	(860) 722-9667			
ABS06103	**PREMIER FLIGHT CENTER	58 LINDBERG DRIVE	(860) 724-2245			
ABS06401	**THREE WINGS AVIATION GROUP, LLC	400 GREAT MEADOW ROAD	(203) 375-5795			
ABS06104	PSI - WEST HARTFORD	1245 FARMINGTON AVE	860-236-5046			
Total for	Total for CT is 6					
	LAS06802 ABS06501 ABS06102 ABS06103 ABS06401 ABS06104	LAS06802 **EXECUTIVE AIR SERVICES ABS06501 **ROBINSON AVIATION, INC. ABS06102 **AMERICAN FLIGHT ACADEMY ABS06103 **PREMIER FLIGHT CENTER ABS06401 **THREE WINGS AVIATION GROUP, LLC ABS06104 PSI - WEST HARTFORD	LAS06802 **EXECUTIVE AIR SERVICES 53 MIRY BROOK ROAD ABS06501 **ROBINSON AVIATION, INC. 50 THOMPSON AVENUE ABS06102 **AMERICAN FLIGHT ACADEMY 20 LINDBERGH DRIVE ABS06103 **PREMIER FLIGHT CENTER 58 LINDBERG DRIVE ABS06401 **THREE WINGS AVIATION GROUP, LLC ABS06104 PSI - WEST HARTFORD 1245 FARMINGTON AVE			

#### Part 107 Certification - Maine / Vermont

ME				
City	Site ID	Site	Address	Phone
AUGUSTA	ABS04301	**MAINE INSTRUMENT FLIGHT, INC	215 WINTHROP STREET	(207) 622-1211
SANFORD	LAS04003	**SOUTHERN MAINE AVIATION LLC	199 AIRPORT ROAD	407-324-8919
TRENTON	LAS04602	**MAINE COASTAL FLIGHT CENTER	112 CARUSO DRIVE	(207) 664-6000
	Tota	l for ME is 3		

City	Site ID	Site	Address	Phone
SOUTH BURLINGTON	ABS05404	BURLINGTON TECHNICAL CENTER	3060 WILLISTON ROAD UNIT 7	(802) 864-1799
SOUTH BURLINGTON	LAS05401	VERMONT FLIGHT ACADEMY	355 VALLEY ROAD	(802) 863-5988
Tet	al for VIT to 2			

Total for VT is 2

# Part 107 Certification - Massachusetts / New Hampshire

City	Site ID	Site	Address	Phone
BEDFORD	ABS01703	EAST COAST AERO CLUB, INC.	200 HANSCOM DRIVE, STE 111	(781) 274-6322
BRIDGEWATER	LAS02301	BRIDGEWATER STATE UNIVERSITY	10 SHAW ROAD	(508) 531-1780
CONCORD	LAS01702	**NATIONAL AVIATION ACADEMY	130 BAKER AVENUE EXTENSION	(781) 274-8448
DANVERS	ABS01901	BEVERLY FLIGHT CENTER, INC.	175 BURLEY ST. HANGAR 10	(978) 774-7755
N. ANDOVER	ABS01801	**EAGLE EAST AVIATION, INC.	492 SUTTON ST.	(508) 683-3314
NORTHAMPTON	ABS01002	NORTHAMPTON AERONAUTICS, INC.	160 OLD FERRY ROAD	(413) 584-7980
NORWOOD	ABS02001	NEW HORIZON AVIATION, INC - NORWOOD	125 ACCESS RD	(781) 762-7600
PLYMOUTH	ABS02301	**ADS FLIGHT CENTER- PLYMOUTH	246 S. MEADOW ROAD	(781) 858-1083
WESTFIELD	ABS01004	WESTFIELD FLIGHT ACADEMY	111 AIRPORT RD.	(413) 568-5800
City	Site ID	Site	Address P	Phone
GILFORD	LAS03201	**DAE AVIATION ENTERPRISE	118 KIMBALL ROAD (6	603) 293-7980
KEENE	LAS03402	MONADNOCK AVIATION INC	80 AIRPORT ROAD 6	603-357-7600
4				

175 AMMON DRIVE

117 PERIMETER ROAD

125 PERIMETER ROAD, #4E

603-880-0044

(603) 882-5606

(603) 595-1395

\*\*NATIONAL FLIGHT SIMULATOR

\*\*AIR DIRECT AIRWAYS

EAST COAST AERO CLUB

MANCHESTER

NASHUA

NASHUA

LAS03103

ABS03003

LAS03002

#### Part 107 Certification - New York

City	Site ID	Site	Address	Phone
CANANDAIGUA	ABS14402	SKYOP LLC	5297 PARKSIDE DRIVE SUITE 435	(585) 598-4737
DUNKIRK	ABS14001	**DUNKIRK AVIATION FLIGHT SCHOOL	DUNKIRK AIRPORT	(716) 366-6938
E. FARMINGDALE	ABS11701	**NASSAU FLYERS, INC.	1300 HEW HIGHWAY GATE 2 HNGR 2	(516) 454-0626
FARMINGDALE	ABS11705	FARMINGDALE STATE COLLEGE	885 BROADHOLLOW ROAD	(631) 420-2532
FARMINGDALE	ABS11704	ACADEMY OF AVIATION TESTING CENTER	7150 REPUBLIC AIRPORT SUITE 101	(631) 777-7772
FARMINGDALE	ABS11707	GLOBAL AVIATION CORP	9100 REPUBLIC AIRPORT	(631) 391-8110
FLUSHING	LAS11301	VAUGHN COLLEGE OF AERONAUTICS- TECHNOLOGY	96-01 23RD AVENUE	718-429-6600, EXT. 205
FLUSHING/QUEENS	ABS11401	FLIGHTSAFETY INTERNATIONAL LA GUARDIA LEARNING CENTER	MARINE AIR TERMINAL, LAGUARDIA AIRPORT	(718) 565-4170
ITHACA	LAS14801	EAST HILL FLYING	TOMPKINS COUNTY AIRPORT	(607) 257-1313
KINGSTON	LAS12401	RICHMOR AVIATION	1155 FLATBUSH ROAD	845-336-5638

#### Part 107 Certification - New York

City	Site ID	Site	Address	Phone
LONG ISLAND CITY	ABS11102	AVIATION HIGH SCHOOL	45-30 36TH STREET	(718) 361-2032
MONTGOMERY	LAS12502	**TAKE FLIGHT AVIATION	49 HANGAR ROAD	845-457-4188
NEW YORK	LAS10003	PROFESSIONAL TESTING CORPORATION	1350 BROADWAY, SUITE 1700	(212) 356-0681
ROCHESTER	LAS14602	**ROCHESTER AIR CENTER	1313 SCOTTSVILLE ROAD	(585) 328-8839
ROME	LAS13401	**GALAXY AVIATION	GRIFFISS AIRPARK	315-336-6120
RONKONKOMA	LAS11702	**MID ISLAND AIR SERVICE	101 HERING DRIVE	(631) 588-5400
RONKONKOMA	ABS11706	A.T.P., INC ISP	90 ARRIVAL AVENUE #901	631-676-3490
RONKONKOMA	LAS11710	**HERITAGE FLIGHT ACADEMY	ISLIP, MACARTHUR AIRPORT	(631) 471-3550
SCOTIA	LAS12301	**RICHMOR AVIATION, INC.	19 AIRPORT ROAD	(518) 399-8171
SUNNYSIDE	ABS11101	ACADEMICS OF FLIGHT INTERNATIONAL, INC NORTH	46-12 QUEENS BOULEVARD, ROOM 204	(718) 937-5716
WHITE PLAIN	ABS10602	ACADEMY OF AVIATION	67 TOWER RD. HANGAR T	(914) 461-2336
	Total for	r NY is 21		

- Applicable regulations relating to small unmanned aircraft system rating privileges, limitations, and flight operation
- Airspace classification and operating requirements, and flight restrictions affecting small unmanned aircraft operation
- Aviation weather sources and effects of weather on small unmanned aircraft performance
- Small unmanned aircraft loading and performance

- Emergency procedures
- Crew resource management
- Radio communication procedures
- Determining the performance of small unmanned aircraft
- Physiological effects of drugs and alcohol
- Aeronautical decision-making and judgment
- Airport operations
- Maintenance and preflight inspection procedures

#### Part 107 Certification - Sample Questions

Which technique should a remote pilot use to scan for traffic? A remote pilot should

- A) systematically focus on different segments of the sky for short intervals.
- B) concentrate on relative movement detected in the peripheral vision area.
- C) continuously scan the sky from right to left.

#### Part 107 Certification - Sample Questions

PLT313 UA.IV.A.K1b

To ensure that the unmanned aircraft center of gravity (CG) limits are not exceeded, follow the aircraft loading instructions specified in the

- A) Pilot's Operating Handbook or UAS Flight Manual.
- B) Aeronautical Information Manual (AIM).
- C) Aircraft Weight and Balance Handbook.

#### Part 107 Certification - Sample Questions

24 . PLT064 UA.V.B.K6a

(Refer to FAA-CT-8080-2G, Figure 22, area 2.) At Coeur D'Alene which frequency should be used as a Common Traffic Advisory Frequency (CTAF) to monitor airport traffic?

- A) 122.05 MHz.
- B) 135.075 MHz.
- C) 122.8 MHz.

#### Part 107 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)

#### **UAS Integration Pilot Program**

#### **(1)** UAS Integration Pilot Program

On October 25, 2017, the President announced a new initiative that pairs unmanned aircraft operators with state, local, and tribal governments to safely expand cutting-edge unmanned aircraft operations. The program will shape a regulatory framework that balances the benefits of UAS technology while lessening the risks to public safety and security.

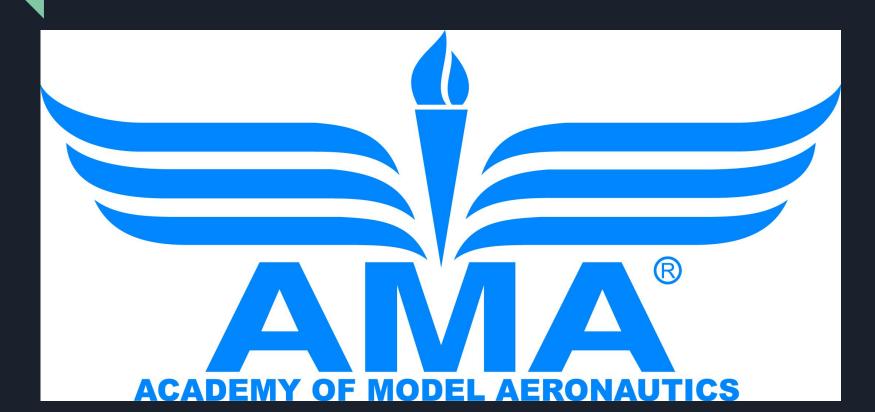


# DOT Secretary Chao Launches Drone Integration Pilot Program

Program accelerates the integration of drones into our airspace by creating various partnerships across the country.



# Original UAV users - Academy of Model Aeronautics



# Insurance - Academy of Model Aeronautics Membership

- Access to AMA-member flying sites
- \$2,500,000 comprehensive general liability insurance
- \$25,000 accident/medical coverage
- \$10,000 maximum accidental death coverage
- \$1,000 fire, theft and vandalism

#### **Ethics**

- Local ordinances
- Property rights
- Privacy rights
- Safety
- Technical proficiency and knowing limits

# What does flying UAVs in cable access look like?

- Single or few staff operators
- No volunteers
- Logged flights
- Budget extra for repairs

# Questions?

#### Thanks!

Tom Bolus\*

Plymouth Area Community Television Instructor

tom@pactv.org

Ryan Webber\*

**Falmouth Public Schools** 

**Educational Access Coordinator** 

ryan@fctv.org

\*IANAL (I am Not A Lawyer)
All info subject to change