

# **Unmanned Aerial Systems Current State Overview**



## **Secure Commonwealth Panel**

### **Unmanned Aerial Systems Sub Panel**

**19 September 2016**

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Virginia Department of Emergency Management**

# **sUAS - Definition**

**Small Unmanned Aircraft System**

**Rotor or Fixed Wing**

**55 lbs. or less**

**(weight inclusive of UAS & Payload)**

# The Mission & Technology Selection

- The mission is what determines the UAS technology/payload selection(s)
  - Purpose/Mission(s) of UAS Flight
  - Geographic area for mission
  - Flight Time Requirements
  - Payload
  - Other special requirements

sUAS Public Safety

Sampling of Use Cases

























# Forensic Traffic Accident Reconstruction

	Time to Measure	Time in Roadway	3D Difference
Accident Team	62 min	35 min	15mm
DJI S800 EVO	27 min	8 min	12mm
Aeryon Scout	17 min	7 min	12mm

Accuracy of measurements by UAS is down to 1 centimeter or less





**RCMP rescue team**

**Injured man**



## Drones can save lives in an avalanche search and rescue mission

The Hague, Netherlands, March 30, 2015

sky NEWS HD

LATEST KATHMANDU



**BREAKING NEWS NEPAL EARTHQUAKE**  
**DRONE FOOTAGE OF DESTRUCTION IN NEPALESE CAPITAL**

14:22 DE 7.8 EARTHQUAKE **BREAKING NEWS** NEPAL EARTHQUAKE: FOREIGN OFFICE EMERGENCY HELPLIN

# Appomattox Tornado Damage



# Essex, VA Tornado Damage Path – Area 1

## Mosaic imported into esri ArcMap



# Essex, VA Tornado Damage Path – Area 1



# Fluvanna, VA Tornado Damage



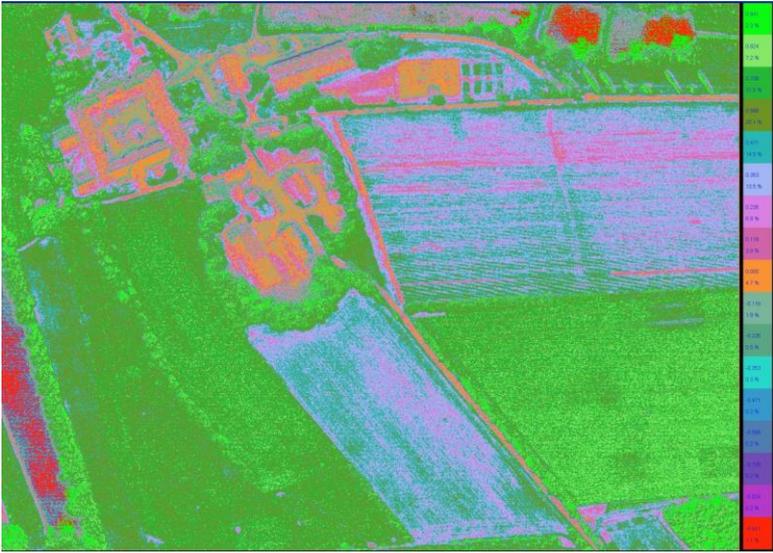
# Appomattox Tornado Path Video











# Functional Examples for CoA

- Incident Situational Awareness (all inclusive)
- Incident Scene Documentation
- Search and Rescue (SAR)
- Forensic Traffic Investigation
- Pre-Incident Planning
- Critical Infrastructure Inspection
- Damage Assessment

# **What You Need to Know**

# Federal Aviation Administration (FAA) Requirements

## Last Year - 2015

### – Public Use

- Required Certificate of Authorization (CoA)
- More complicated application/review process
- Remote pilot requirements
  - Pilot license OR
  - Flight ground school & physical
- Required filing of Notice to Airmen (NOTAM) with FAA for flights
- Must identify all UAS technologies that will be used

### – Commercial Use

- Required Section 333 Exemption
- More complicated application/review process
- Remote pilot requirements
  - Pilot license OR
  - Flight ground school and physical
- Required filing of Notice to Airmen (NOTAM) with FAA
- Must identify all UAS technologies that will be used

# Federal Aviation Administration (FAA) Requirements

## This Year - 2016

- Public Use (April)
  - Requires Certificate of Authorization (CoA)
  - Simplified and faster application/review process
  - Remote pilot requirements
    - Self Certification
    - Remote Pilot and UAS Technology must be registered
  - NO LONGER REQUIRED - Filing of Notice to Airmen (NOTAM) with FAA for flights
  - NO LONGER REQUIRED – Must identify all type(s) of UAS being used
  
- Commercial Use (August 29)
  - Part 107 Rules in effect
  - Simplified and faster application/review process
  - Waivers required to exceed blanket FAA rules
  - Remote pilot requirements
    - Part 107 – Pass Airman's
    - Remote Pilot and UAS Technology must be registered
  - NO LONGER REQUIRED - Required filing of Notice to Airmen (NOTAM) with FAA
  - NO LONGER REQUIRED – Must identify all type(s) of UAS to be used

# Federal Aviation Administration (FAA) Requirements

- Public Use (Title 49) – Department must have a Certificate of Authorization (COA)
  - Letter of Declaration
  - Individual organizations cannot apply, must be through the locality
  - UAS technology must be owned by the locality (with identified exceptions)
- Commercial Use – Require certification as defined by Part 107 – Knowledge Test

# CoA, Part 107 or Both?

Recommendation: To have the most versatile ability and knowledge to safely utilize UAS, public safety organizations should acquire a CoA and have their remote pilots also certified as Part 107.

Note: Prior to flight, the remote pilot must choose which rules will be used. Cannot mix and match between CoA and Part 107.

# CoA Process

- Submission of Declaration Letter to FAA
- FAA Approval of Declaration Letter
- Access to CoA Online Portal
- Submission of online CoA application
- FAA Approval of CoA
- Locality is now legal to fly under the FAA Rules and Requirements

# Public Declaration Letter Construct

- That the individual making the declaration is not the entity who is requesting to operate as a public aircraft operator (No Self Certification)
- The individual making the declaration is in a position to determine that the entity requesting to operate as a public aircraft operator is actually qualified. Hence the reason why for your agency, the State attorney General or Locality Attorney is the appropriate party.
- That the letter references the two sections in title 49 USC (40102A(41)(C) and 40125B) so that the individual making the declaration understands that the entity is a political subdivision of the state based on these sections.
- They reference some section in the State Statute that declares that the entity qualifies as a political sub division of the state for the purposes of operating as a public aircraft operator.
- That the entity that is requesting to operate as a public aircraft operator will not operate for compensation or hire in reference to Title 49 USC 40125B.
- And that the declaration letter is dated and signed by the individual making the declaration on that agencies (i.e. Attorney General of the State or locality attorney) letterhead.

**Example of declaration letter  
From the City of Charlottesville  
Approved by the FAA**

CITY OF CHARLOTTESVILLE

"A World Class City"

Office of The City Attorney  
City Hall  
P.O. Box 911 • 605 East Main Street  
Charlottesville, Virginia 22902  
Telephone: (434) 970-3131  
Fax: (434) 970-3022  
www.charlottesville.org



July 1, 2015

Unmanned Aircraft Systems (UAS) Program  
Federal Aviation Administration  
800 Independence Avenue, SW  
Washington, DC 20591

RE: Public Declaration Letter for the City of Charlottesville, Virginia

Dear UAS Program:

This letter is intended as the required "public declaration letter" of the City of Charlottesville, for the purposes of applying for a Certificate of Authorization to operate an unmanned aircraft.

As City Attorney for the City of Charlottesville, I hereby certify that the City of Charlottesville is a political subdivision of the State of Virginia, in accordance with 49 U.S.C. 40102(a)(41)(C) and 49 U.S.C. 40125(b). See Article VII of the Virginia Constitution; Va. Code § 15.2-100, *et seq.*; and City of Charlottesville Charter, 1946, c. 384, as amended.

I further certify that the City does not intend to use unmanned aircraft for any commercial purposes as defined in 49 U.S.C. 40125. The City understands that use of the City's aircraft for compensation or hire is beyond the scope of the permitted uses for public aircraft pursuant to 49 U.S.C. 40125.

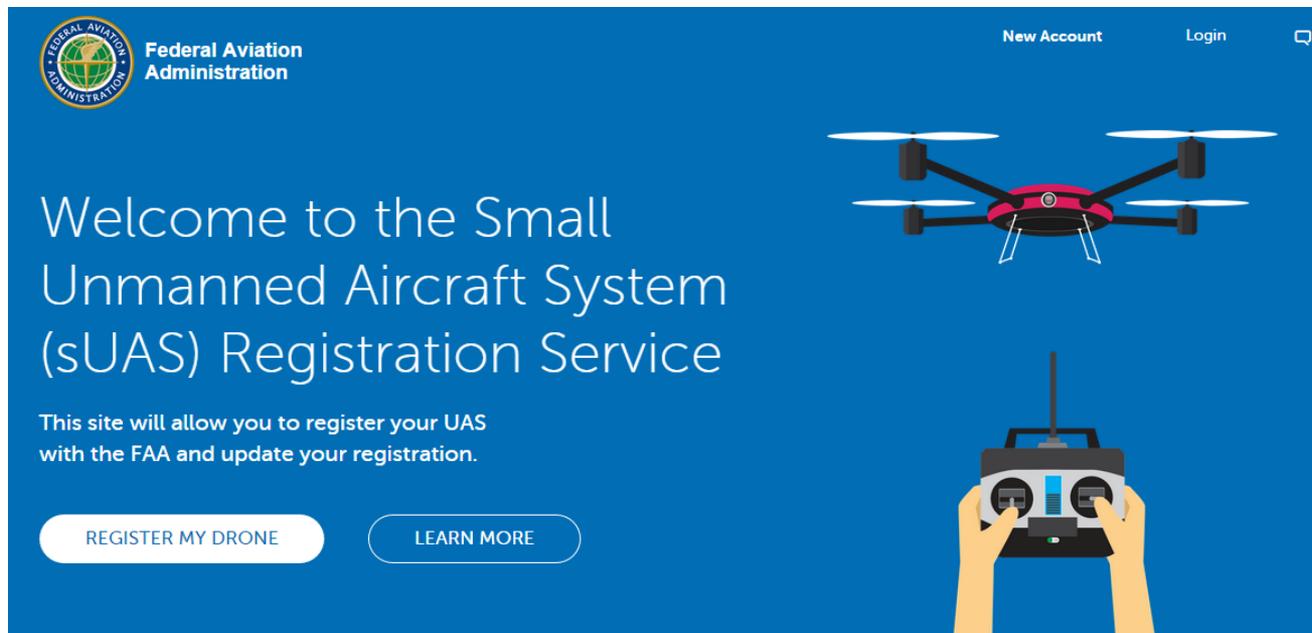
Thank you for your assistance with this matter. If you have any questions, please do not hesitate to contact me.

Sincerely,

*S. Craig Brown*  
S. Craig Brown  
Charlottesville City Attorney

# UAS Registration Requirement

- **Registration requirement effective Dec. 21**
  - Small UAS > 0.55 lbs. flown outside must be registered
- **Full details available at:** [www.faa.gov/uas/registration](http://www.faa.gov/uas/registration)



# UAS Requirements

- Training Program/Documentation
- Operational proficiency
- Airworthiness of UAS (specific to each UAS)
- Maintenance
- Documented Policies & Procedures
- Liability Insurance
- Understanding of UAS flight limitations
- Understanding of Weather
- Understanding of National Air Space flight restrictions and Temporary Flight Restrictions

# sUAS Apps

**HOVER**

Brought to you by  
**Analytica**

Kevin Johnson

Dan Held

Rate our App      Feedback

Disclaimer: We do not assume responsibility for the accuracy of the data represented in this app. The data is gathered from public APIs and RSS feeds.

**READY TO FLY** ▼

Weather	✓
Kp - Index	✓
Wind	✓
Temperature	✓
No Fly Zone	✓

W      2 M/S      E

SW      S      SE

Kp-Index      0

Sunrise      7:19 am

Sunset      5:37 pm

, United States of America

Search by addr

Harrisonburg

Virginia

Richmond

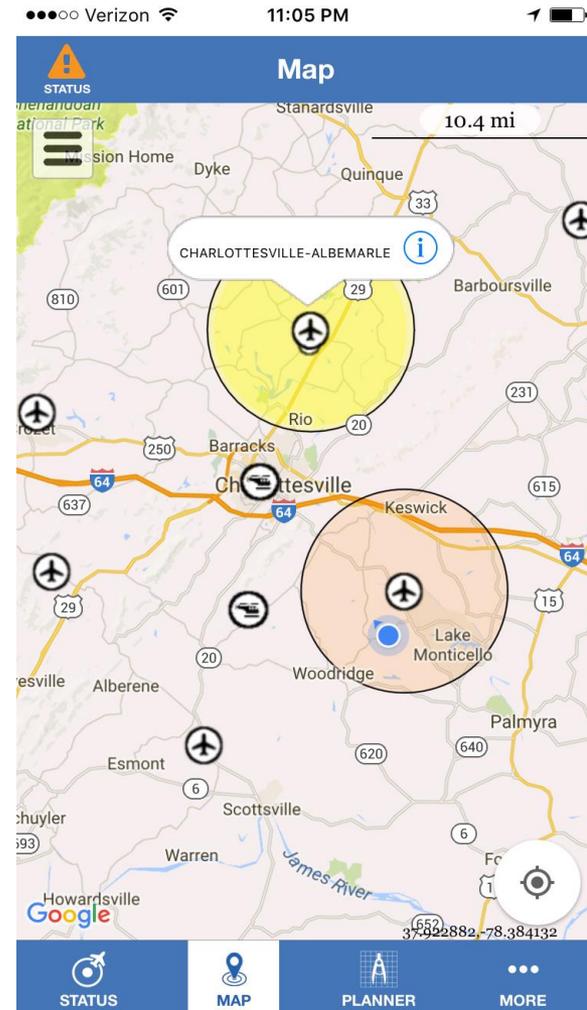
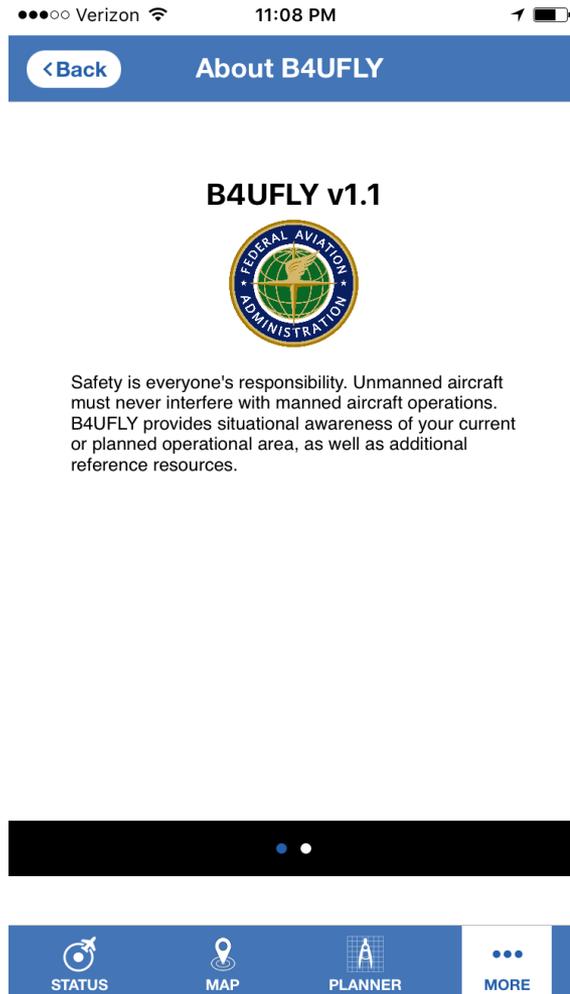
POWERED BY AIRMAP

Street      Satellite

Back

The *Kp-index* is the global geomagnetic storm *index* and is based on 3 hour measurements of the *K-indices*, for iva gen value, for each of the past days.

# sUAS Apps



# UAS Payload Examples

## (constantly changing)

- Camera
  - Still digital photos
  - Digital video
  - Infrared (IR)
  - Multi-Spectral
- Sensors
  - Radiation
  - Heat
  - Hazmat

# UAS Payload Examples (cont'd)

- Safety line
- Medicine/Food
- Personal Flotation Device
- Other
- Spraying capability (mosquitos)

# Insurance/Liability

- For the drone itself (in case of crash) – some drone companies offer crash insurance.
- Liability insurance – recommended for all



# Privacy/Freedom of Speech

- UAS will generally be used for purposes other than law enforcement surveillance/investigation.
- Law enforcement must meet specific guidelines, especially for surveillance or situations that require a search warrant. Also requirements of video storage requirements and FOIA.
- Law enforcement cannot stop the flight of UAS without cause.

# Public Perception

- Must develop a media strategy that outlines the UAS program uses for GOOD.
- Demonstrate successes in other communities
- Work with multiple agencies to develop cooperative environment and mutual aid

# Law Enforcement Related Issues

- The FAA regulates the national air space.
- State & local law enforcement can intervene in use of UAS if it is interfering with an incident (state law).
- Law enforcement must meet specific guidelines, especially for surveillance and must seek search warrant as already dictated by law.
- UAS is considered an aircraft, federal law prohibits the shooting of an aircraft
- Federal law also prohibits discharge of firearm from an aircraft

# sUAS Program Continuum



**Authorization, Purpose, Who is in Charge?**

**Operational Policies/Procedures/Maintenance**

**Selection of sUAS/Payloads for Defined Mission(s)**

**Training/Proficiency/Scenario Based Flight Training**

**SAR/Situational Awareness/Incident Documentation**

# Commonwealth HS Staff Activity

- Working closely with FAA, interacting with and monitoring rule changes
- Development of draft minimum requirements for review and further discussion
- Worked with Piedmont VA Community College to develop a “pilot” curriculum for responders
- Advisory capacity to other public safety entities interested in UAS
- Involved with White House Workshop on Future of UAS
- Advisor to the Metro-Washington COG UAS Working Group
- Involved with NPSTC UAS Working Group
- Involved with Police Foundation UAS Task Force
- Involved with NFPA Technical Committee on UAS (serving as Committee Chair)
- Working jointly with the VA Department of Aviation & Department of General Services
- Working with NIST UAS Test Site
- Ongoing conversations with the Mid Atlantic Aviation Partnership (MAAP)

# PVCC Activity

- One of first community colleges with R&D CoA and night flight operations
- One of first in Virginia to develop a UAS flight curriculum for emergency responders
- Working with other agencies, VDEM, Technology, Fire and Law enforcement, DHS
- Collecting/sharing example SOPs and best practices
- Addressing both public safety training aspects and Part 107 certification

# PVCC Video

# **Public Safety Agencies Involved in Classes, Receiving Advisory Info or Engaged in Discussions**

- Albemarle County Sheriff's Office
- Fluvanna County
- Bedford City
- Rockingham County Fire
- York County Sheriff & Fire
- Appalachian Search and Rescue
- VA Dept of Emergency Management
- City of Richmond Fire
- Henrico County Fire
- Prince Georges County Fire
- Central Virginia Fire Chiefs

# National Activities involving Public Safety UAS

- International Association of Fire Chiefs UAS Task Force
- International Association of Fire Chiefs Technology Council UAS Committee
- National Fire Protection Association Technical Committee on UAS
- International Association of Chiefs of Police UAS Committee
- Police Foundation UAS Working Group
- NIST Interagency Board UAS Working Group
- National Public Safety Telecommunications Council UAS/Robotics Working Group

**Questions???**

# Contact Information

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