Unmanned Aircraft System (UAS)

Drone 101 and Program Overview

Policy Year 2017
Regional Workshop

Aviation Systems Engineering Company

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Agenda

- **Overview of Drones**
- **Introduction of LGITs Drone Program**

Goals

- **Raise awareness** about drone regulations, legislation, safety, and technology
- **Review forthcoming LGIT process** for providing coverage for organizational drone programs

- **This presentation is not…**
  - Legal counsel
  - Training for how to fly a drone
  - What drone to purchase

ASEC: highly credentialed and experienced manned and unmanned aviators

Overview of Drones

Background

The Narrative is Shifting

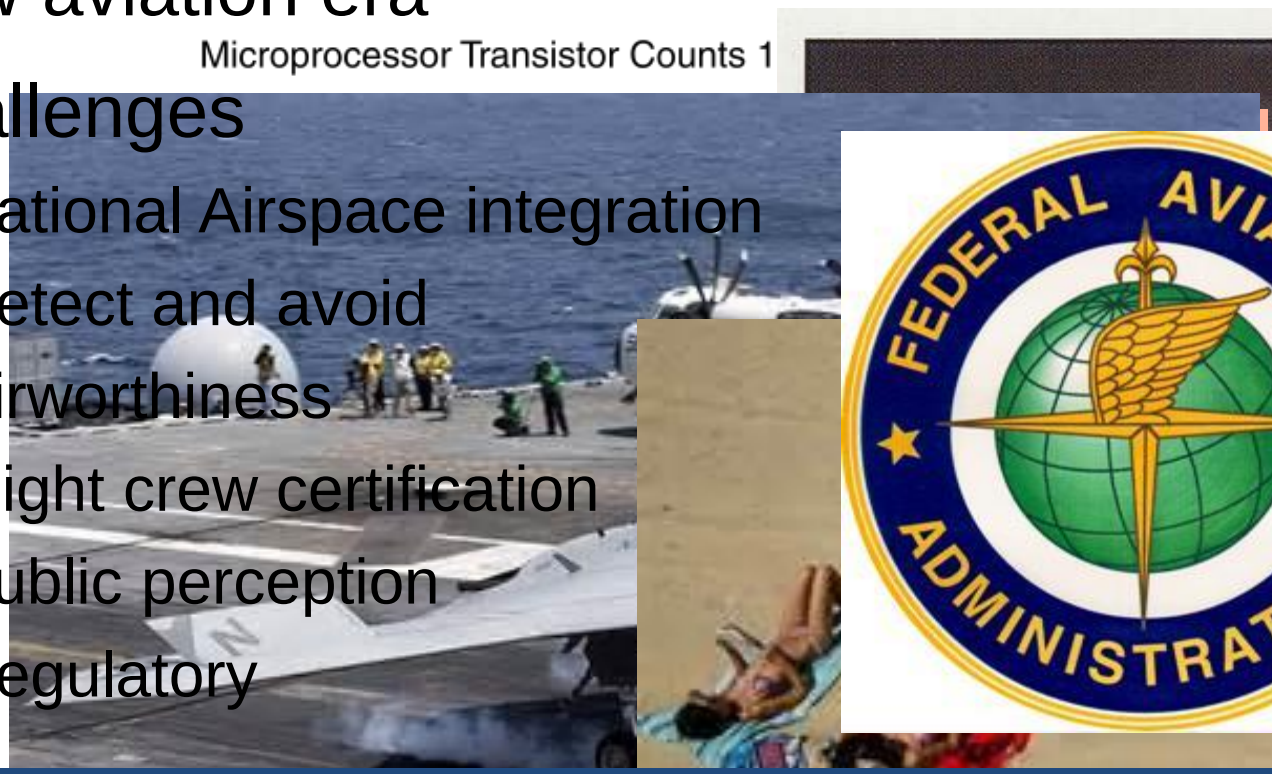
- Privacy
- Culture
- Unsafe
- Cost
- Regulations

DRONES!

- Save Lives
- Save Time
- Save Money

UAS Snapshot

- New aviation era
- Challenges
  - National Airspace integration
  - Detect and avoid
  - Airworthiness
  - Flight crew certification
  - Public perception
  - Regulatory



*"The FAA's delays are due to unresolved **technological**, **regulatory** and **privacy issues**, which will prevent the FAA from meeting Congress' 30 September 2015 deadline for achieving safe UAS integration"*

- US DoT Inspector General Audit Report, June 26, 2014

The Name

Drone

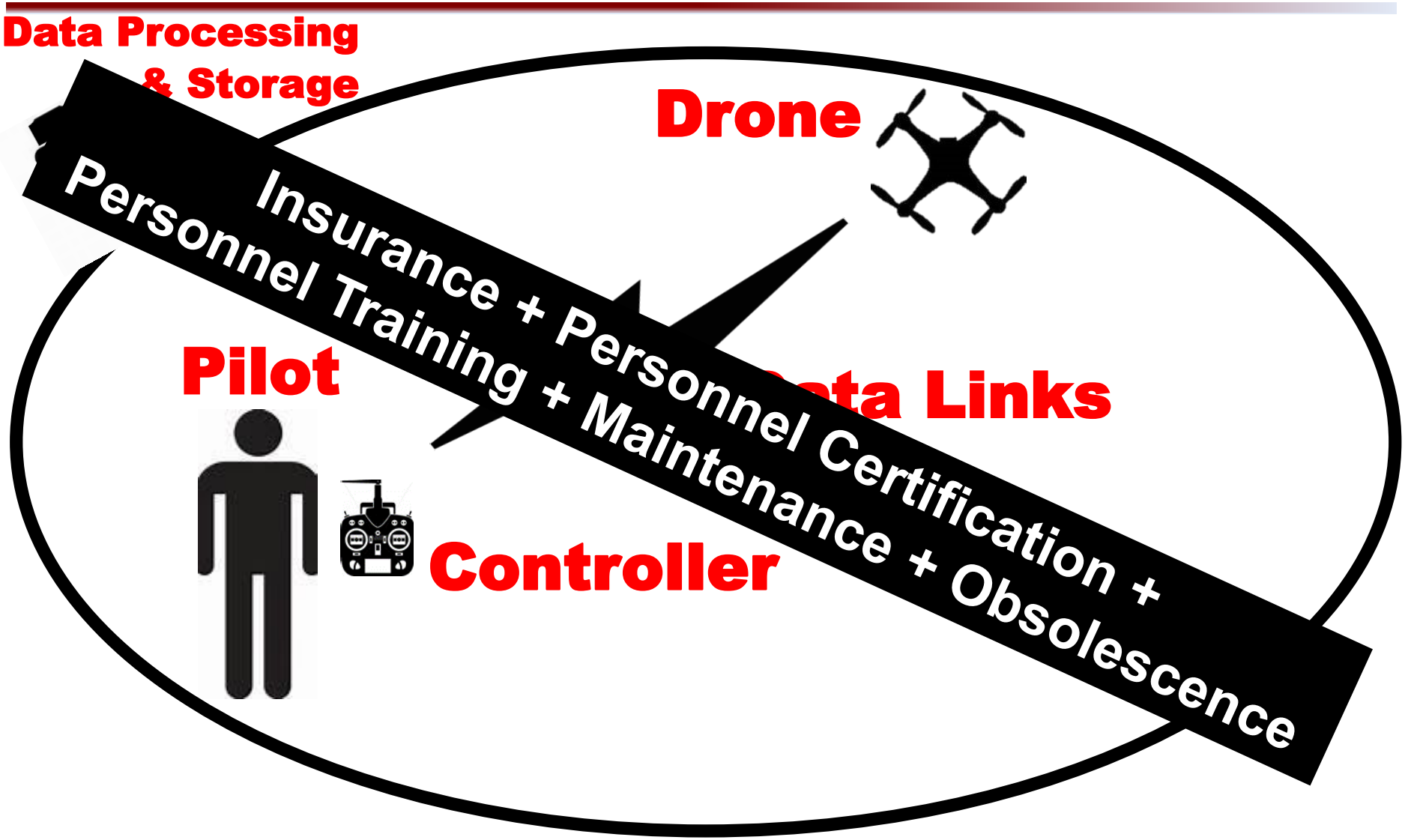
or

Unmanned Aircraft System (UAS)

or

Remotely Piloted Aircraft

The System


Data Processing
& Storage
Drone
Insurance + Personnel Certification +
Personnel Training + Maintenance + Obsolescence
Pilot
ta Links
Controller

Small UAS Overview

Air vehicle

- Weighs less than < 55 lbs, speed < 100 mph
- Most battery powered: 15-20 min flight time
- Cost varies: $1,000 - $100,000

Payload

- Electro optic, thermal, more…
- Gimbaled or fixed camera
- Some with follow-me/point of interest

Common safety features

- Return to home after signal loss
- Auto land before battery depletion
- Electronic geofencing
- Obstacle avoidance (coming)
- Various levels of autonomy, manual override

Ground station

- Receives streaming video or photo's
- Displays vehicle telemetry on map

Example Drone Hardware

Bundle contains:

a. Type: DJI Inspire
b. Pilot controller
c. Camera controller
d. Batteries
e. Chargers
f. Pilot iPad (32GB, WIFI)
g. Camera Operator iPad
h. Extra props
i. ND lens
j. Memory stick
k. Carrying case
l. Camera (4K HD)

Amazon: $5,456

Overview of Drones

Regulations

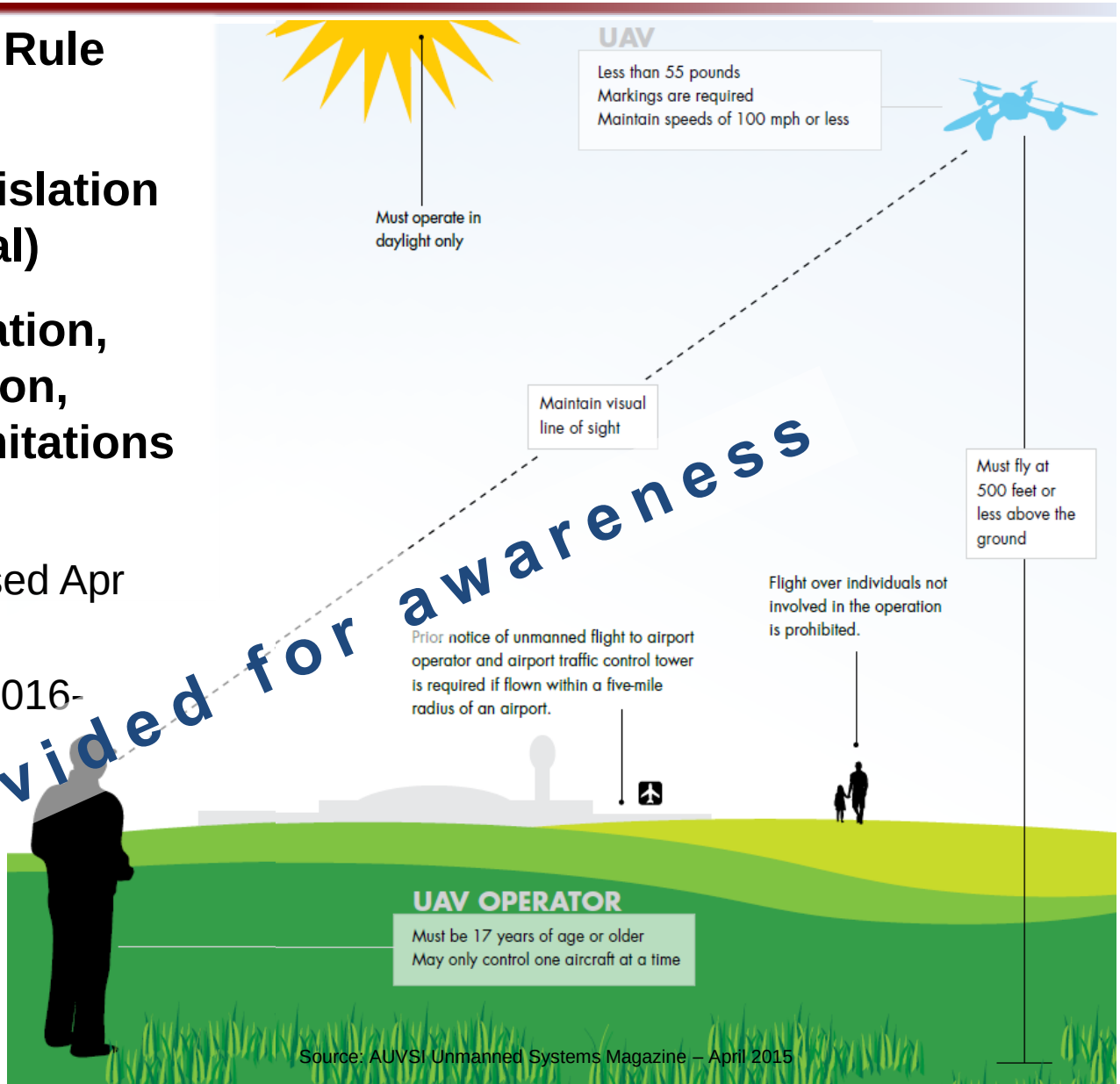
Who Can Fly Drones?

The FAA categorizes three entities

1. **Civil (Commercial):** used to promote or advance a business (ASEC)
2. **Model (Recreational):** personal interests and enjoyment….using a UAS to take photographs for your own personal use
3. **Public (Government):** law enforcement, public universities, and local/state/federal government organizations (**LGIT Members**)
   - Each case is unique, but generally FAA approval will include the following criteria
     - Licensed FAA pilot, or maybe just ground school
     - Fly lower than < 400’ above ground level
     - Drone remains within visual line of sight of pilot
     - Flight during daytime only
     - Organization will self-certify drone airworthiness
     - Coordination unique to geographic area, such as coordination with airports or sensitive areas

What's Next for Civil (Commercial)

- **Notice of Proposed Rule Making**
- **<u>Draft</u> small UAS legislation for Civil (commercial)**
- **Describes classification, operators certification, registration, and limitations**
- **NPRM Timeline**
  - Comment period closed Apr 2015
  - Final Rule between 2016-2017??



Source: AUVSI Unmanned Systems Magazine – April 2015

FAA Recreational Guidance

Hobby or recreational flying doesn't require FAA approval but you must follow safety guidelines.
Any other use requires FAA authorization

Don'ts

- Don't fly near manned aircraft
- Don't fly beyond line of sight of the operator
- Don't fly an aircraft weighing more than 55 lbs unless it's certified by an aeromodeling community-based organization
- Don't fly contrary to your aeromodeling community-based safety guidelines
- Don't fly model aircraft for payment or commercial purposes

Do's

- Do register your aircraft if it weighs more than 0.55 lbs. (Not the same as N-Number)
- Do fly a model aircraft/UAS at the local model aircraft club
- Do take lessons and learn to fly safely
- Do contact the airport or control tower when flying within 5 miles of the airport
- Do fly a model aircraft for personal enjoyment

http://www.faa.gov/uas/publications/model_aircraft_operators/

Overview of Drones

Start-up

Public (Gov't): Program Start-up

1. **Organize**
   - Identify drone requirements
   - Build concept of operations
   - Develop budget
   - Research equipment options
   - Identify personnel
   - Keep it simple

2. **Communicate (top concern)**
   - Chain of command and elected officials
   - Public transparency
   - Get approval (stop here unless approved)

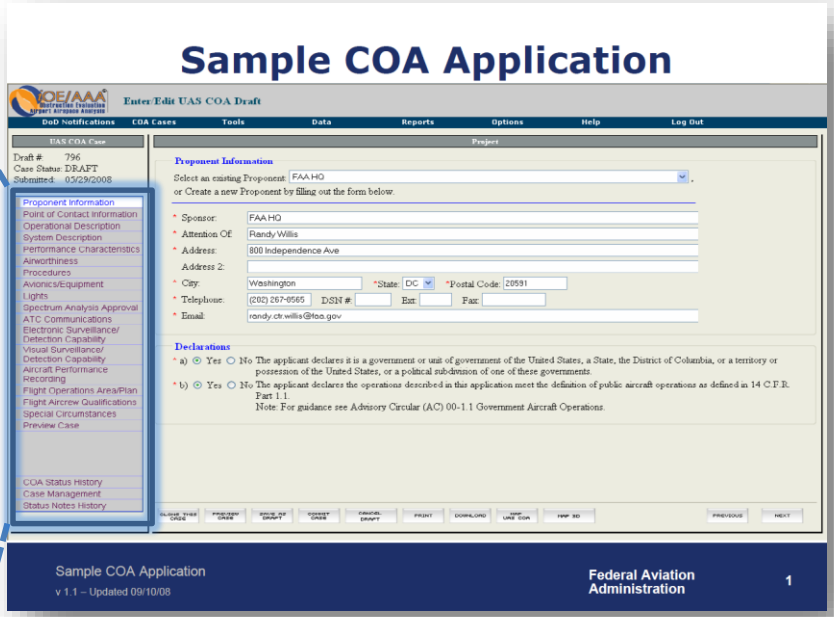
3. **Implement**
   - Obtain declaration letter that states organization is gov't entity
   - Coordinate with local FAA, airports, military, etc.
   - Procure equipment
   - Develop program: manuals, training, crew, policy, safety programs, etc
   - Submit COA
   - Obtain insurance coverage

4. **Sustainment**
   - Training
   - Repair/replacement
   - Personnel

Public (Gov't) COA

- **Certificate of Authorization (COA)** from FAA required to use sUAS
  - Issued for a specific period of time, usually 2 year
  - Agency provides FAA "declaration letter" from the city, county, or state attorney's office assuring the proponent is recognized as a political subdivision of the government

- Proponent Information
- Point of Contact Information
- Operational Description
- System Description
- Performance Characteristics
- Airworthiness
- Procedures
- Avionics/Equipment
- Lights
- Spectrum Analysis Approval
- ATC Communications
- Electronic Surveillance/ Detection Capability
- Visual Surveillance/ Detection Capability
- Aircraft Performance Recording
- Flight Operations Area/Plan
- Flight Aircrew Qualifications
- Special Circumstances
- Preview Case



- **How to apply for a COA?**
  - Letter to FAA proves organization is a public entity
  - FAA awards access to COA Online website
  - Avg. processing time is < 60 days
  - FAA typically approves "training phase" COA, followed by an operational COA that usually is "jurisdictional"

Overview of Drones

Use Cases

Early Adopters

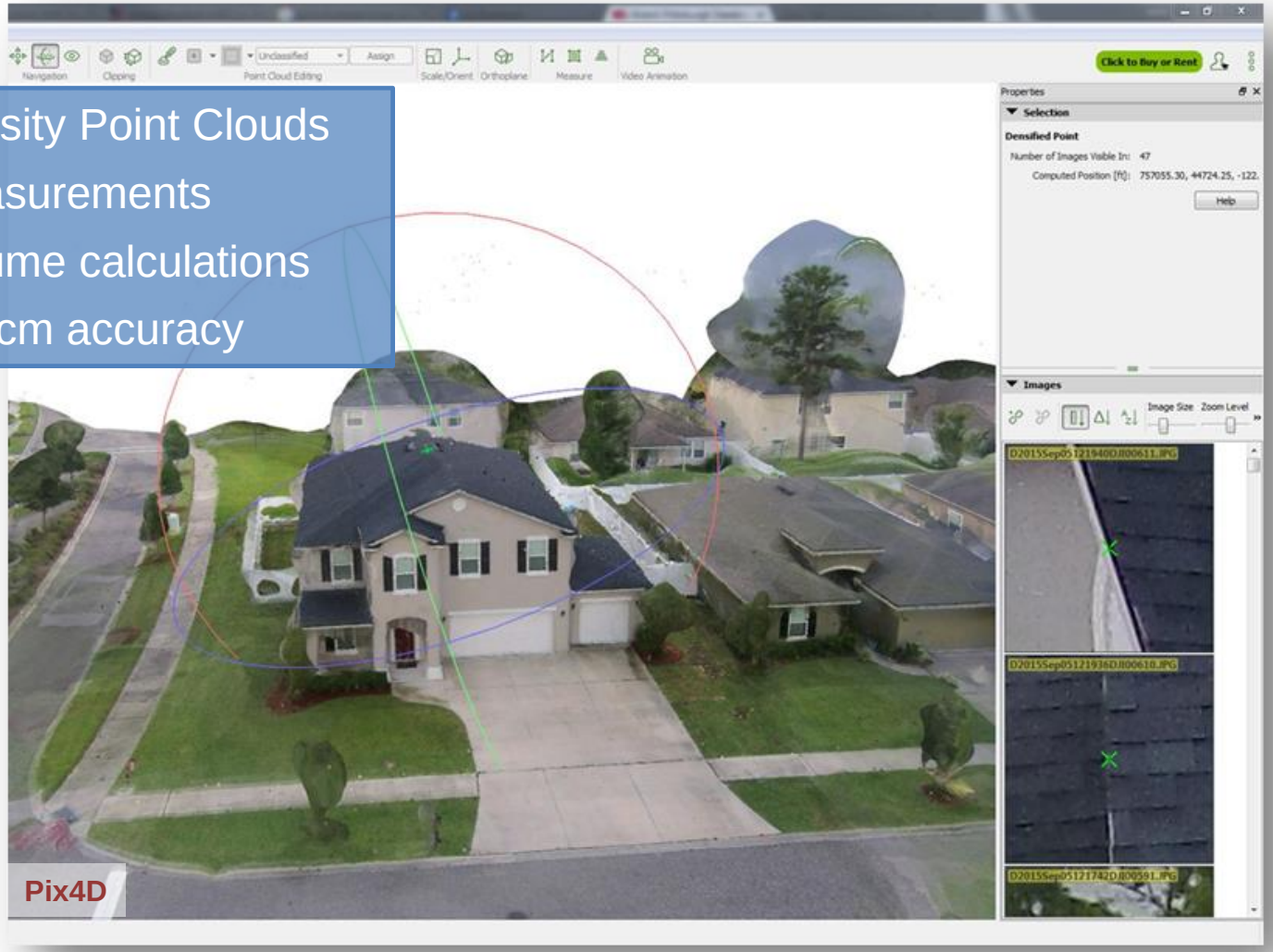
- **Law Enforcement**
  - Searches for persons
  - Accident photography
  - Tactical operations
- **Emergency Management**
  - Wildfires
  - Flooding
  - Train derailment
- **Fire-rescue**
- **Economic Development**
- **Landfill assessment**
- **Construction project development**
- **GIS products**
- **More**

New Tools For Drone Images

Software developers creating new tools for drones

3D Models

- Density Point Clouds
- Measurements
- Volume calculations
- 2-4 cm accuracy



Tools for Fire-Rescue

Three synchronized video's of house fire – simulcast (TV show "24")

1. HD Video Drone: HD 4K video flown by ASEC drone/pilots
2. Ground Video: Hand held camera
3. Thermal Video Drone: Thermal video streamed to Command Unit by ASEC drone/pilots

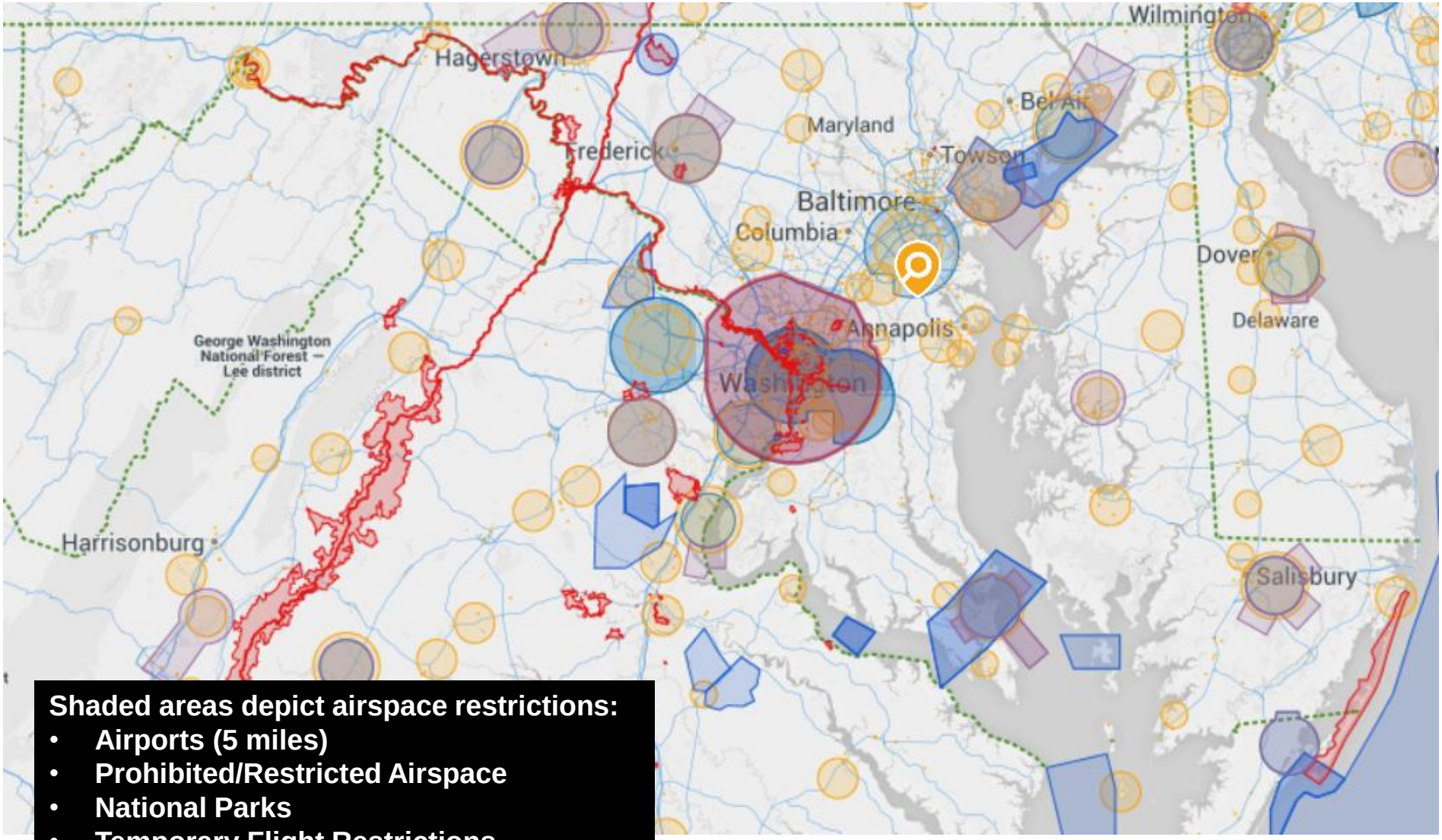
Risk Considerations

2015 Incidents

- Bard College's Center for the Study of the Drone identified 327 "close encounters" between drones and manned aircraft over a 21-month period that ended in Sept 2015.
- Drones flying over wildfires in California forced authorities to pull back firefighting planes in some cases to avoid a mid-air collision.
- Student flew a drone over a packed football stadium at the University of Kentucky, crashing into the stands - no injuries.
- An 18-month-old boy in the U.K. lost an eye after being hit in the face by the propeller of a drone flown by a family friend.

The amount of damage a drone can inflict on a commercial or another manned aircraft remains speculative because there's little or no data

Maryland Airspace



Shaded areas depict airspace restrictions:

- **Airports (5 miles)**
- **Prohibited/Restricted Airspace**
- **National Parks**
- **Temporary Flight Restrictions**

http://knowbeforeyoufly.org/air-space-map/

Top Risk Considerations

- Rapid change: One drone year = 30 days
- Federal regulations progressing, but remain undefined and not standardized
- MD state law favorable…for now (privacy)
- Public perception of government drone operations is typically not favorable
- MD contains some of the most restrictive airspace in country
- It's not if, but when, a drone mishap occurs…solid programs will prevail
- Technology evolving towards greater safety

LGIT Drone Program

LGIT Drone Program

- **Purpose.** Address the needs of LGIT members who use, or are pursuing the use of UAS for official government business.
- **Overview.** LGIT developing process to provide coverage to qualified members
  - **Part 1: Application/Audit.** The Application begins the process for obtaining drone coverage and includes a step-by-step, audit for members to self asses ability to meet LGIT's standards.
    - Organizations that are unable to satisfy the standards may retain services from a qualified vendor to assist addressing areas of concern.
    - The self-audit identifies areas requiring more attention or support, striking a balance between program flexibility and standardization of essential safety management processes.
    - Audits should be conducted during program start-up as a tool to develop safe and compliant programs. Subsequent audits will occur annually, or when triggered by a significant event or change in the program.
  - **Part 2: Insurance.** LGIT will provide coverage upon satisfactory completion of Part 1.
- **Implementation**. Summer 2016

Application Sampling

Types of Questions that will be addressed in Application

- Does the organization have an established UAS program?
- Does the program have a FAA approved Certificate of Authorization (COA)?
- If the organization is a government entity, does it have a signed letter so designating it by the MD Attorney General?
- Does the organization have UAS operations and maintenance manuals?
- Does the organization have a UAS training program?
- Are there written organizational policies for electronic data management and privacy considerations?
- Is the program managed by a third party?
- Does the organization own or lease the UAS?
- Has organization applied for insurance before, or been ever been denied?
- What aviation licenses, certifications, ratings and training does the Named operator possess?

Audit Sample

Each audit is very broad and not all parts may be necessary depending on the member, location, mission, and other factors. Below are elements used for the audit/underwriting prior to coverage.

Safety Management System
- Safety Policy and Objectives
- Safety Risk Management
- Safety Assurance
- Safety Promotion
- Compliance Monitoring
- Flight Data Analysis

Personnel
- Crew member duties and responsibilities
- Crew member qualifications
- Crew member medical
- Maintenance qualifications
- Other personnel

Training
- Training Program
- Crew Resource Management
- Emergency Procedures and Safety Training
- Proficiency
- Medical certifications
- Records

Environmental Management
- Airspace
- Terrain
- Population density
- Climate
- Time of day
- Geographic area

Equipment
- Air vehicle
- Communication and Navigation
- Ground equipment
- Payload
- Software
- Emergency Equipment
- Safety features
- Operational Characteristics
- Unique or novel components
- Launch and recovery methods
- Logistics
- System maintenance requirements

Operations
- Standard Operating Procedures
- Flight Planning and Pre-flight Requirements
- Operational Control
- Weather minima
- Operating Requirements
- Safety Briefing
- Use of Checklists
- Proximity to humans
- Proximity to obstacles
- Dispatch process
- MISHAP plan
- Occupational Health and Safety
- Security
- Flight tempo
- Mission types

Management and Policy
- Organization structure
- Physical Location
- Authority to operate
- Organization Operators Manual
- Privacy Guidance
- Data Management Guidance
- Local, state, and federal law
- Third party support
- Own/lease equipment
- Public Outreach Program

Questions?

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