Unmanned Aerial Systems
and
Infrastructure Inspections
(Drones)

Current Methods

Usage

- Replacing expensive access when hands-on is not always needed
- When hands-on is never done due to return on investment or dangers
- When time constraints prevent current methods of access
- Provide overview prior to plan more expensive means of access
- Confined space entry

Usage

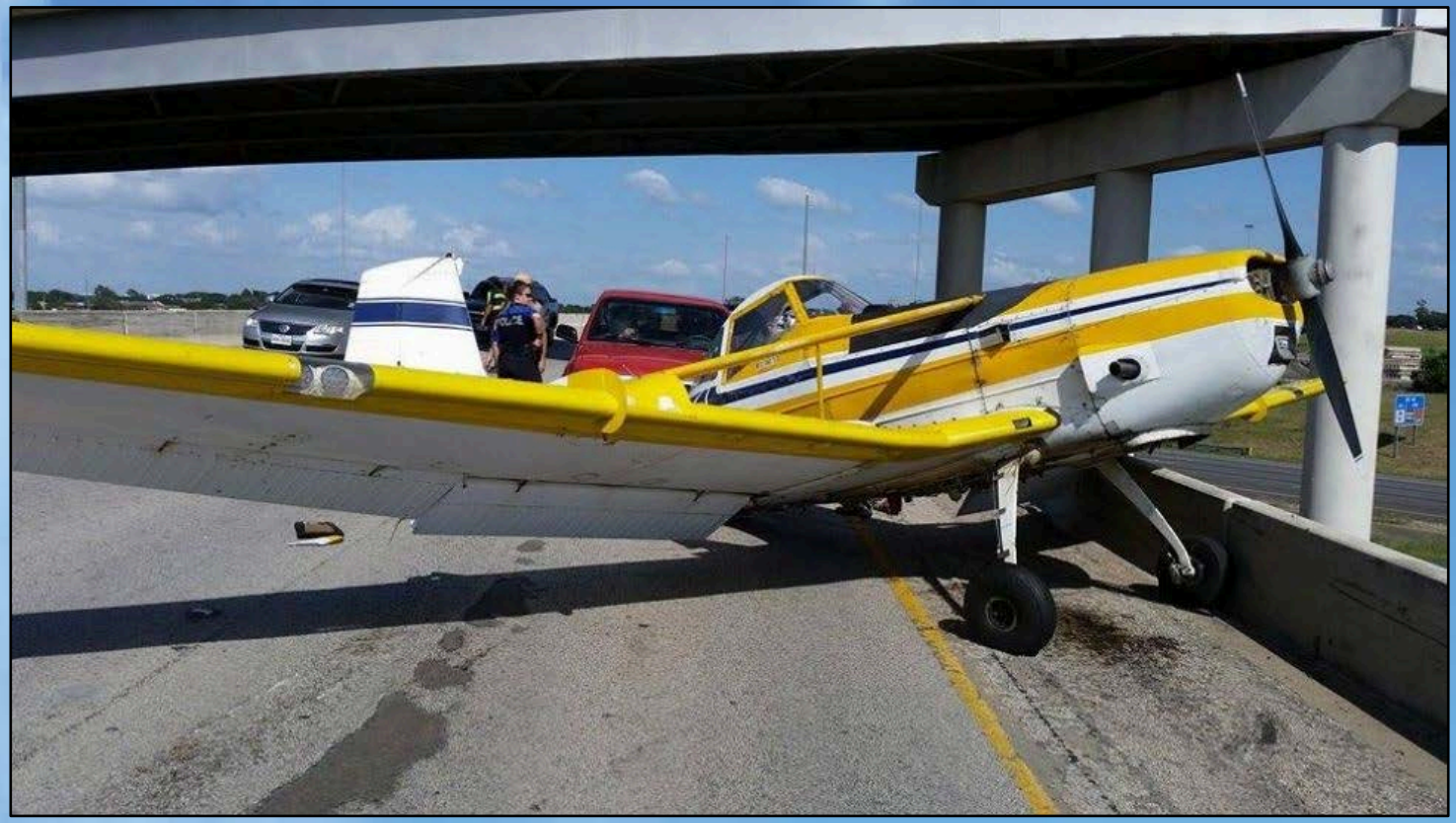
- Bridges, Overlane signs, High Mast Light Poles, Other High Ancillary Structures
- Structure inspections are expensive, dangerous, and time consuming.
- Drones will make inspections cheaper, safer, and faster.
- Drones do not replace inspectors or engineers. Drones acquire visual imagery in order to focus and expedite the inspection.
- Subject to weather, limited use over traffic

UAS Design

- Unique challenges associated with inspection drones.
- Do you want:
  - GPS?
  - Infrared?
  - Ultrasound?
  - LIDAR?
  - Microwave?
  - Laser range finders?
- We can do that. But remember…

UAS Design

- It still has to fly under a bridge!



- Size is a critical limitation, and bridges block GPS signals.

Scout UAS

- Collects high-resolution visual imagery in confined spaces.
- 15 minutes of flight time, 5 minute turnaround time.
- Not dependent on GPS.
- Up to 20 megapixel/10x optical zoom images.
- Independent camera operator station with full control of camera gimbal, zoom, focus, and shooting mode.
- LED spotlight.
- Portable charging station enables all-day flying.

Additional UAS

- Cinestar Heavy Lift.
- Capable of carrying more sophisticated payloads.

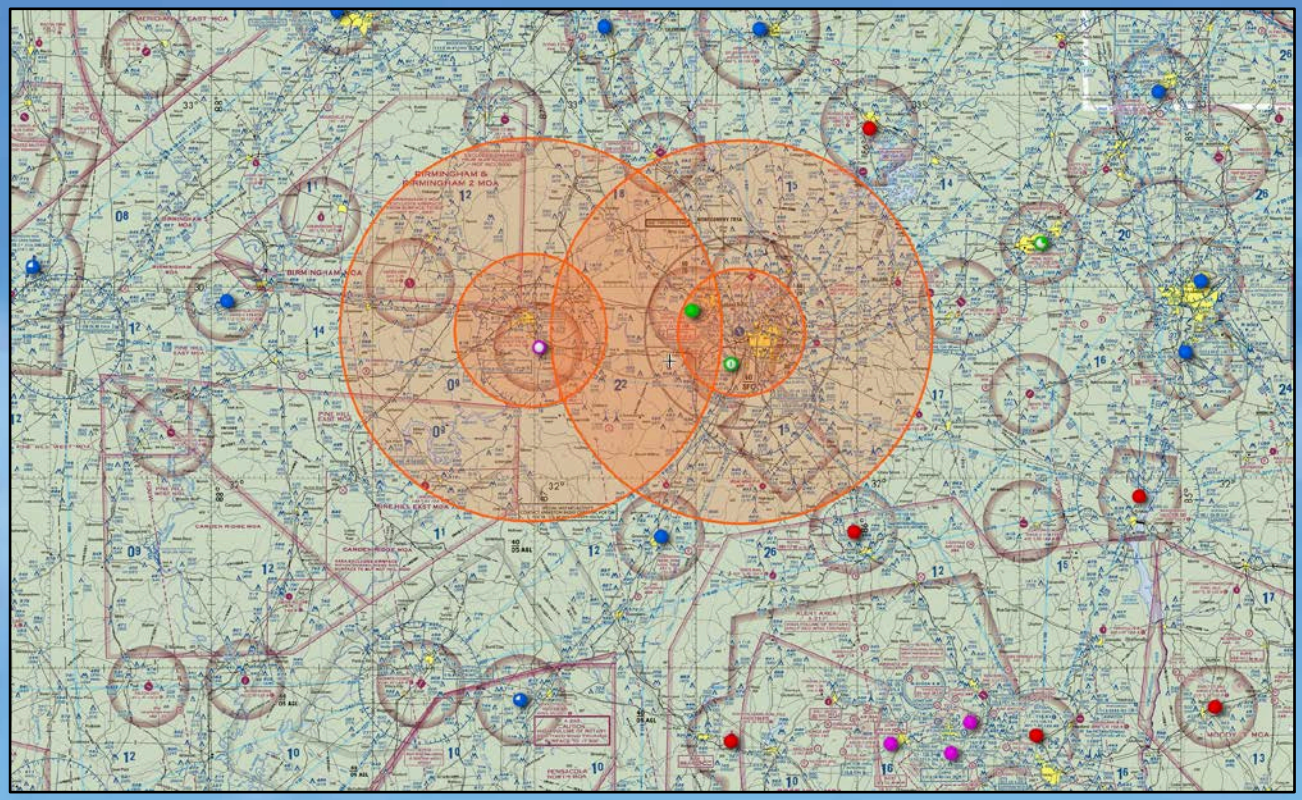
Additional UAS

- “Think you can fit in there?”
- “Uhh… let me grab the Phantom.”

Operations

- **Planning Phase**
  - Air traffic Control
  - Law Enforcement
  - DHS Coordination
  - Local residents
  - Spectator Control
  - Identify additional resources, i.e. a boat.

Airspace



Safety

- Military aviation based safety program
- Checklists: “Did you hit record?”

RISK ASSESSMENT WORKSHEET

HAZARD	CONTROL	PROBABILITY (LOW/MED/HIGH)	SEVERITY (1-4)	GO/NOGO

Severity: 1 = normal operations; 2 = potential damage to equipment; 3 = potential damage to property; 4 = potential injury.
Hazards with a severity of 3-4 must be controlled to “LOW” probability.

SAFETY BRIEF

I. Preflight Planning
- ☐Air Traffic Control Coordination
- ☐Local Law Enforcement Coordination
- ☐Local Resident Coordination
- ☐Spectator Control Measures
- ☐Risk Assessment Worksheet

II. Client Brief
- ☐Mission Overview:
  - i. Big to small
  - ii. Line of sight
  - iii. Launch and recovery zones
- ☐Minimum safe distance: 20’. Do not stand directly beneath the UAS.
- ☐Designated spotter:
  - i. Obstacles
  - ii. Interlopers
  - iii. Aircraft
- ☐Frequency Interference Prevention:
  - i. WiFi/Bluetooth
  - ii. Radios/Walkie-Talkies
  - iii. Video transmitters

III. Questions?

Insurance

- General SkyCam carries $1,000,000 liability coverage

- Illegal Acts Exclusion Clause

Legal

- Judge ruled FAA cannot enforce laws that don't exist.

Legal

- Model aircraft regulations
- Section 333 Exemptions
- COAs
- Academic SAO safety code
- Proposed regulations
  - UAS less than 55lbs
  - Line-of-sight only
  - Daylight only
  - Max airspeed 100mph
  - Below 500’ AGL
  - At least 17 years old
  - Must pass FAA UAS operator course

- General SkyCam Strategy
  - Abide by model aircraft regulations and proposed regulations.
  - Exercise sound judgment.

Video

GENERAL SKYCAM

VOLKERT