Flight Guardian

Unmanned Aerial Systems (UAS)

for

American Association of Port Authorities

Administration and Legal Issues Seminar

New Orleans, LA

April 9, 2015

Flight Guardian

Our Services:

- Educating public and private organizations about Unmanned Aircraft Systems (UAS)
- Advice on the Selection of Specific UAS platforms
- UAS Procurement Oversight
- Flight, Mission, and Operational Training
- Consulting related to FAA, Regulations, Applications, Specifications, Certifications, Operations, etc.

Flight Guardian

Our Experience:

- Over 35 years of combined **Aviation** experience
- Over 30 years of combined **Public Safety** experience
- Over 25 years of combined **UAS** experience within our Partner Network
- Over 30 years of combined **Consulting Services**

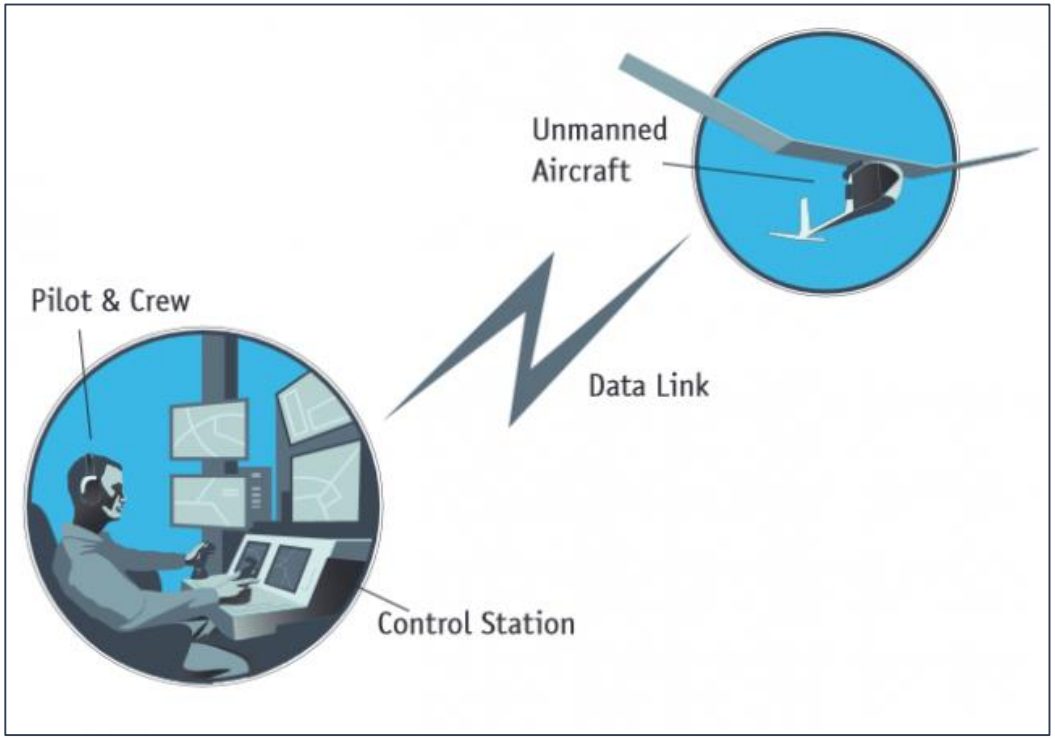
To discuss today…

Points of Discussions will Include today……

- UAS Airframes Overview
- Payloads
- Situational Awareness
- Security Operations
- Security Breach Flyovers
- Operational Safety
- Sensors
- Waterborne Missions
- Latest FAA Actions

According to the FAA:
Collectively several components make up a
Unmanned Aircraft System (UAS)

UAS =



Common *"References"* to UAS you'll normally hear…….

"Drone"	Military Connotations
"R/C"	Hobbyist & Non Commercial
"UAV"	Becoming a Commercial Term
"ROA"	Old FAA Term (Remote Operated A/C)
"Quad Copter"	Somewhat of a *"Slang"*
"UAS" or "UA"	*** FAA …. Use This One
"Small UAS"	Weighs 55 lbs. or less including payload

Airframes

UAS are typically classified several ways:

- Flight Characteristics
- Takeoff & Landing Methods
- Source of Power
- Weight

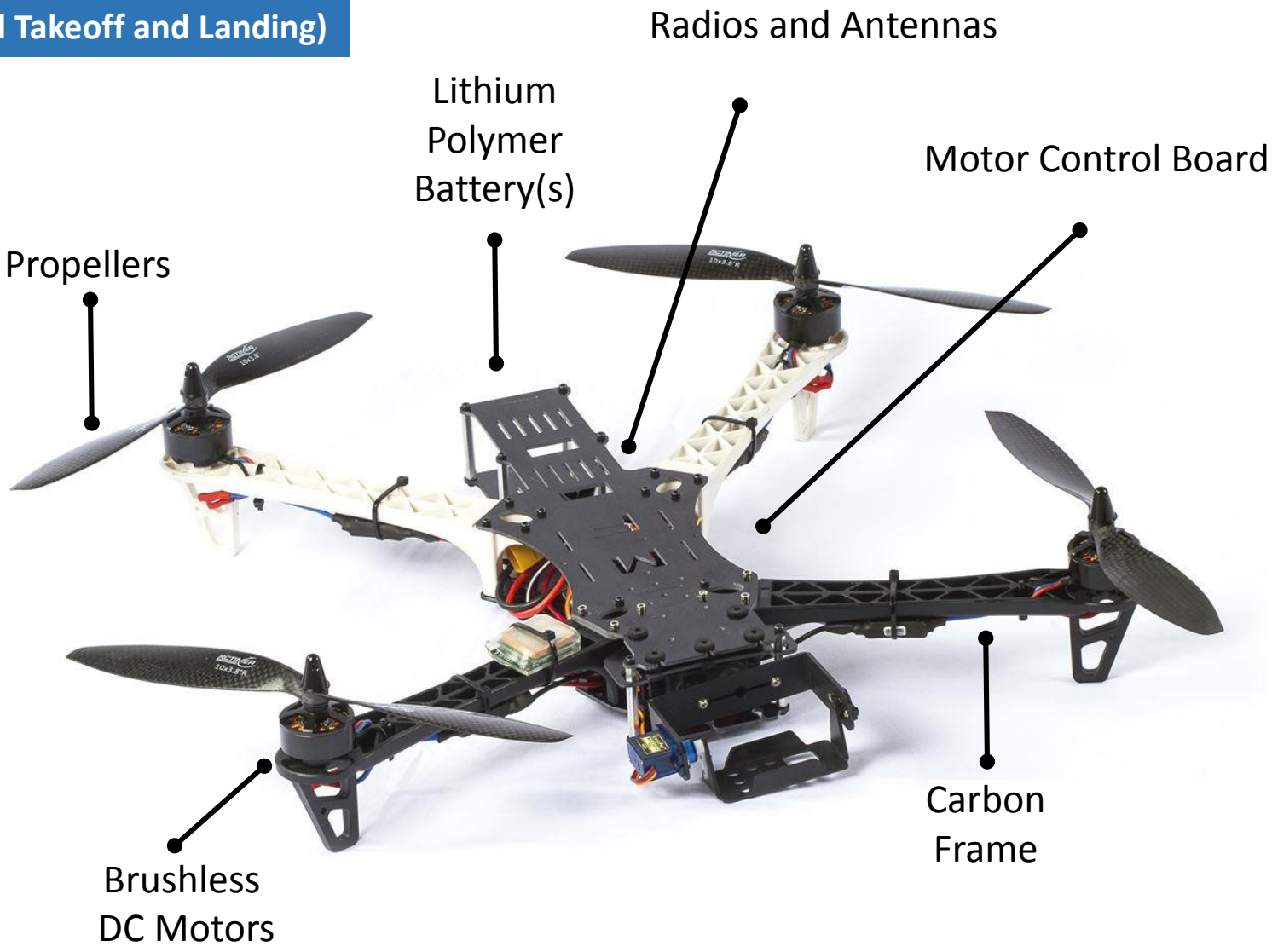
Flight Characteristics:

VTOL
(Vertical Takeoff and Landing)

Rotor Wing
(Helicopter)

Fixed Wing
(Airplane)

VTOL
(Vertical Takeoff and Landing)

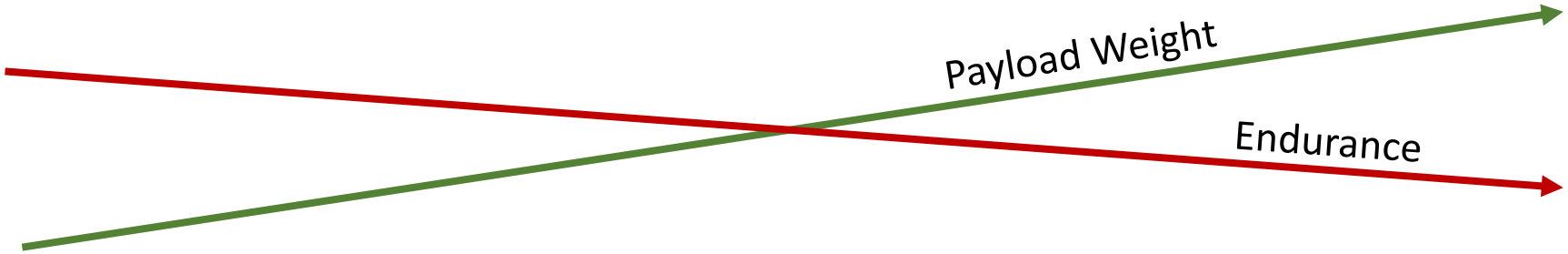


What are the Types of UAS Aircraft?

VTOL
(Vertical Takeoff and Landing)

VTOL Variations

Quad Copter	Hexa Copter	Octo Copter
		
2 to 5 lb. Payloads 45 to 60 Minutes	5 to 10 lb. Payloads 30 to 45 Minutes	10 to 15 lb. Payloads 30 Minutes or Less



What are the Types of UAS Aircraft?

Rotorcraft (Helicopter)

Rotorcraft Variations

Single Rotor & Tail Rotor

Counter Rotating Rotors

What are the Types of UAS Aircraft?

Fixed Wing (Airplane)

Fixed Wing Variations

Hand Launch

Catapult Launch

What are the Types of UAS Aircraft?

Fixed Wing (Airplane)

Fixed Wing Variations

Parachute Recovery

Landing & Stall Recovery

Payloads

UAV Payloads on the Market:

- Intelligence, Surveillance, Reconnaissance (ISR)
- Real Time Video
- Electro-optical/Infrared Camera (EO/IR)
- High Resolution 4K Cameras
- Multispectral Cameras
- LiDAR

Payload Configurations:

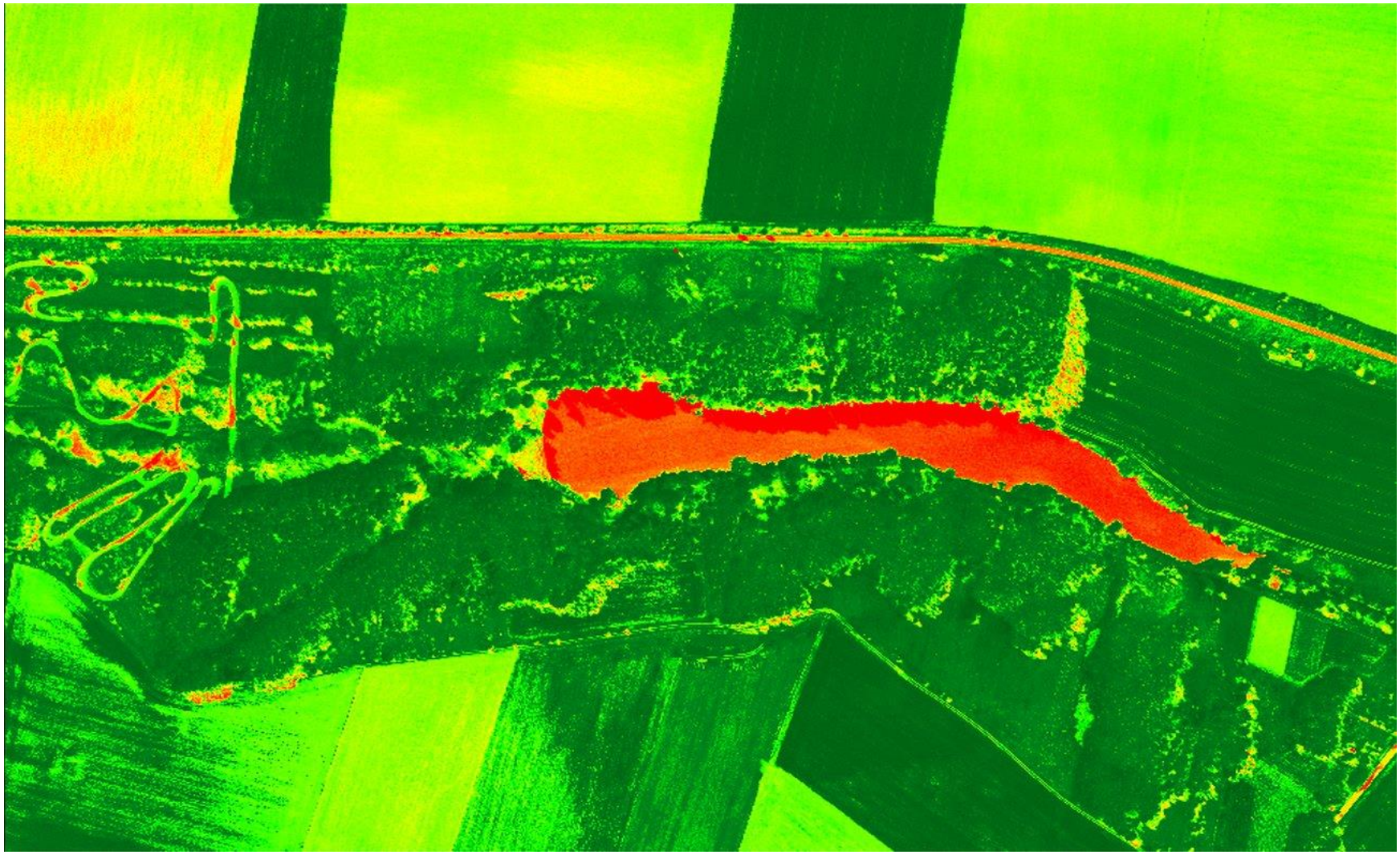
Payloads

What are the Types of UAS Payloads?

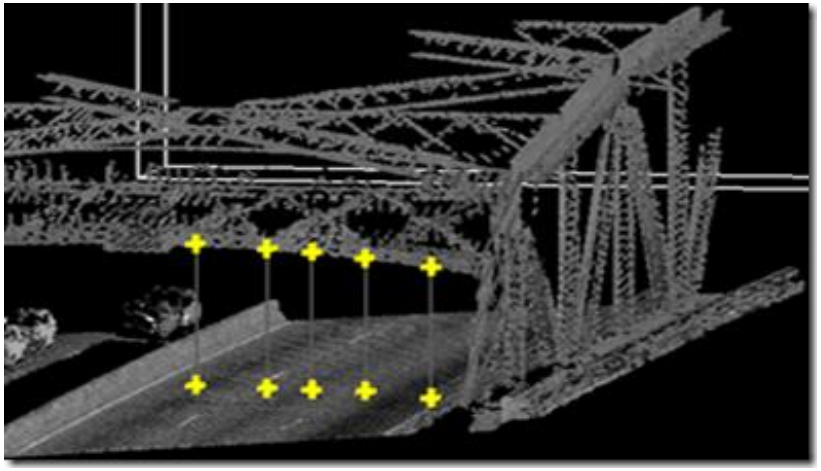
Before Hurricane

After Hurricane

NDVI (Normalized Difference Vegetation Index):
RGB & Near I/R



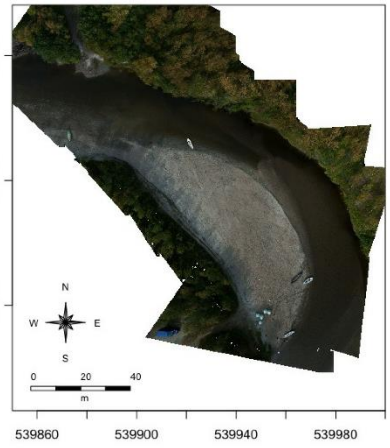
LiDAR (3D Engineering Models):

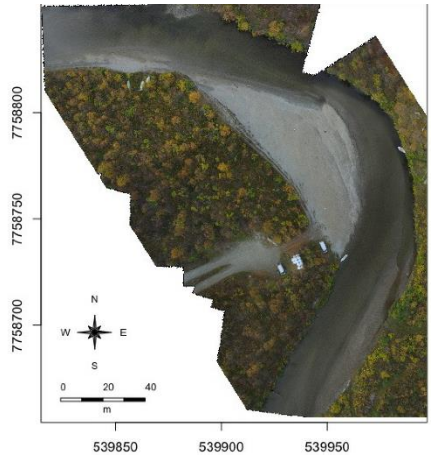


Bridges

Intersections

Street Construction



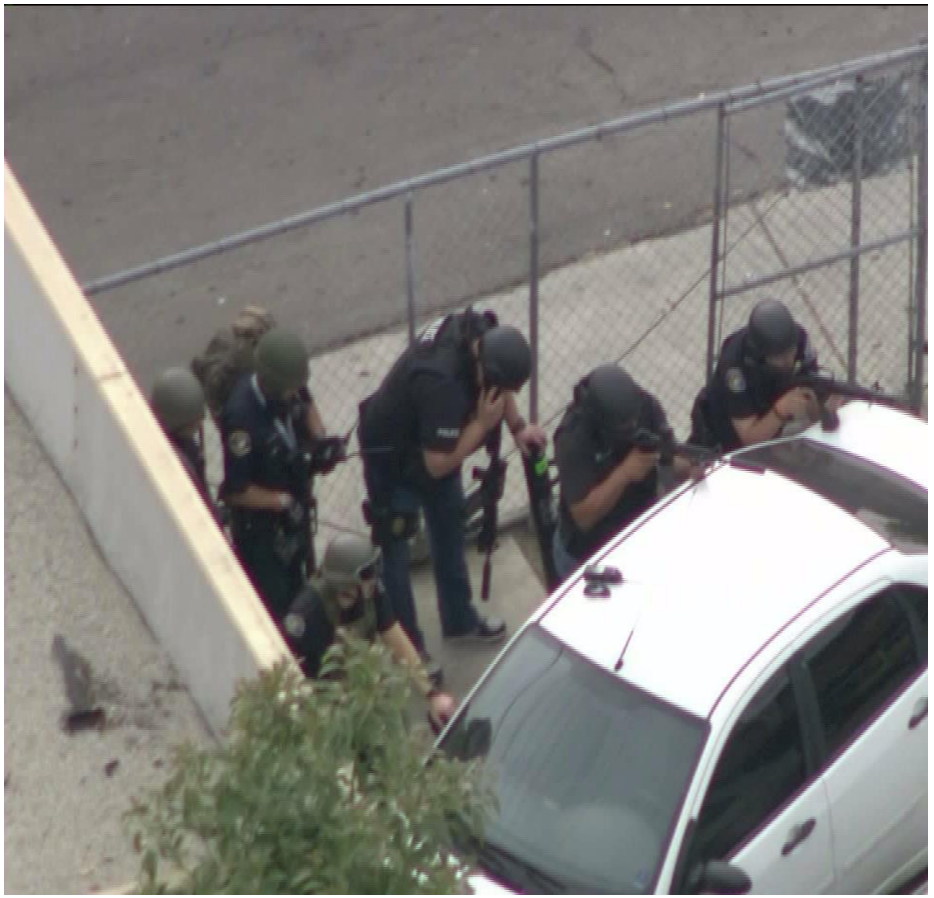


Waterways

Flight Missions

What are the Types of Missions?

- Day to Day Port Security Operations
- Alarm/Breach Response
- Container Screening
- Rooftop Security
- Emergency Response
- Training
- Situational Awareness



What are the Types of Missions?

- Suspicious Persons
- Suspicious Vehicles
- Tactical Operations
- Fleeing Suspect
- Perimeter Security Checks
- Motor Vehicle/Vessel Accident Investigations
- Hazardous Material Response
- Crime Scene Investigation and Documentation

What are the Types of Missions?

- Fire Ground Command
- Search and Rescue
- Communications Enhancement
- Hazardous Materials Response

What are the Types of Missions?

- Sensor / Plume Observation
- Pre and Post Natural Disaster Documentation

What are the Types of Missions?

- Container Screening with Sensors
- Site Mapping
- Infrastructure Security
- Marketing Videos

Example of 3D Site Mapping and Virtual Training (Simulator)

Waterborne Operations

Becoming Approved to Fly

Three (3) Areas of "Discussions" around UAS's Use:

- Safely & Efficiently coexisting in the National Airspace System (NAS) with existing aircraft.
- Protection from any harm to people and property.
- Privacy

- **COA – Certificate of Authorization(Public)**
- **333 Exemption (Commercial)**
- **DOJ MOU – Public Safety**

Overview of Small UAS Notice of Proposed Rulemaking
Summary of Major Provisions of Proposed Part 107

The following provisions are being proposed in the FAA's Small UAS NPRM.

Operational Limitations

- Unmanned aircraft must weigh less than 55 lbs. (25 kg).
- Visual line-of-sight (VLOS) only; the unmanned aircraft must remain within VLOS of the operator or visual observer.

- At all times the small unmanned aircraft must remain close enough to the operator for the operator to be capable of seeing the aircraft with vision unaided by any device other than corrective lenses.
- Small unmanned aircraft may not operate over any persons not directly involved in the operation.
- Daylight-only operations (official sunrise to official sunset, local time).
- Must yield right-of-way to other aircraft, manned or unmanned.
- May use visual observer (VO) but not required.
- First-person view camera cannot satisfy “see-and-avoid” requirement but can be used as long as requirement is satisfied in other ways.
- Maximum airspeed of 100 mph (87 knots).
- Maximum altitude of 500 feet above ground level.
- Minimum weather visibility of 3 miles from control station.
- No operations are allowed in Class A (18,000 feet & above) airspace.

- Operations in Class B, C, D and E airspace are allowed with the required ATC permission.
- Operations in Class G airspace are allowed without ATC permission
- No person may act as an operator or VO for more than one unmanned aircraft operation at one time.
- No careless or reckless operations.
- Requires preflight inspection by the operator.
- A person may not operate a small unmanned aircraft if he or she knows or has reason to know of any physical or mental condition that would interfere with the safe operation of a small UAS.
- Proposes a microUAS option that would allow operations in Class G airspace, over people not involved in the operation, provided the operator certifies he or she has the requisite aeronautical knowledge to perform the operation.

Operator Certification and Responsibilities

- Pilots of a small UAS would be considered “operators”.
- Operators would be required to:

Pass an initial aeronautical knowledge test at an FAA-approved knowledge testing center.

- Be vetted by the Transportation Security Administration.
- Obtain an unmanned aircraft operator certificate with a small UAS rating (like existing pilot airman certificates, never expires).
- Pass a recurrent aeronautical knowledge test every 24 months.
- Be at least 17 years old.
- Make available to the FAA, upon request, the small UAS for inspection or testing, and any associated documents/records required to be kept under the proposed rule.
- Report an accident to the FAA within 10 days of any operation
- that results in injury or property damage.
- Conduct a preflight inspection, to include specific aircraft and control station systems checks, to ensure the small UAS is safe for operation.

Aircraft Requirements

- FAA airworthiness certification not required. However, operator must maintain a small UAS in condition for safe operation and prior to flight must inspect the UAS to ensure that it is in a condition for safe operation. Aircraft Registration required (same requirements that apply to all other aircraft).
- Aircraft markings required (same requirements that apply to all other aircraft). If aircraft is too small to display markings in standard size, then the aircraft simply needs to display markings in the largest practicable manner.

Model Aircraft

- Proposed rule would not apply to model aircraft that satisfy all of the criteria specified in Section 336 of Public Law 112-95.
- The proposed rule would codify the FAA's enforcement authority in part 101 by prohibiting model aircraft operators from endangering the safety of the NAS.

Next Steps To Consider

A Few Things to think about……

- Who are all the stakeholders related to UAS needs, operations, and strategy?
- Does your organization have a UAS Road Map/Strategy that extends into the next 3 to 5 years?
- What is your organization's position, policy, and enforcement toward **Private Citizen** use of UAS inside your jurisdiction?
- How are you handling PR, News Releases, and Interviews when they arise related to UAS operations and policy?
- What would your due diligence and procurement process look like to secure UAS hardware, software, and services once you move forward?

Flight Guardian

Chip Johnson

Chip.johnson@flightguardian.com

(803) 331-9036

Dvaid Hilton

David.hilton@flightguardian.com

(404) 229-3044