

DRONE SCHOOL 101

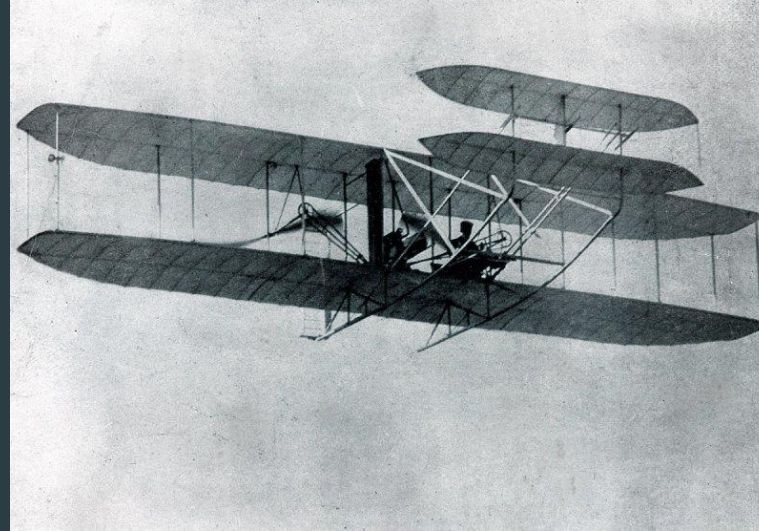


OKLAHOMA AERONAUTICS COMMISSION



History of Aviation

- First Flight – 1903
- Louis Bleriot – 1909
- Jet Engine – 1939
- Supersonic Flight - 1947
- Human Spaceflight – 1961
- Other notable aviation inventions:
 - Cabin pressurization
 - Composite construction
 - Rotorcraft
 - Instrument flying
 - Turbofan engines
 - Autopilot



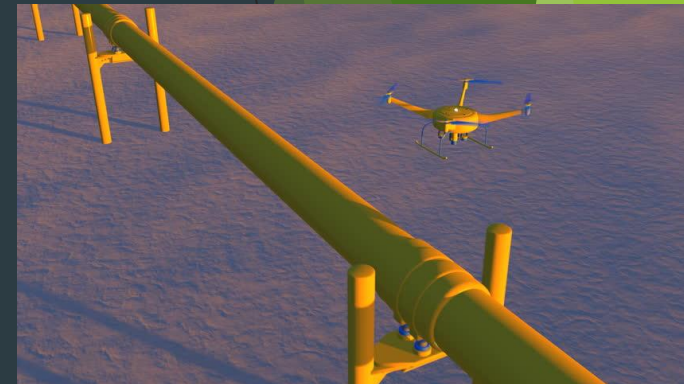
New Era of Aviation

- Early Flying Days 1903 – 1920s
- Pre WWII and WWII – 1930s & 1940s
- Jet Age – 1950s
- Space Race – 1950s – 1970s
- Commercial Flying – 1970s - present
- UAS – 2000s - ????
- UAM – ???????



What is UAS?

- UAS – Unmanned Aircraft System
 - An unmanned aircraft and its associated elements
- Full system consists of a remote pilot, ground transmitter, and unmanned aircraft
- UAS usually fly with a payload of some sort



Payloads

- Cameras
 - Visible Light (normal Cameras)
 - Navigation
 - Survey
 - Photogrammetry
 - Inspection
 - Thermal
 - Inspection
 - Surveillance
- Lidar
 - Survey
 - Accurate topography
- Other Sensors
- Cargo



Potential Drone Applications



Security

Firefighting

Flood Monitoring

Aerial Photography

Communications

Breach Monitoring

Pipeline Monitoring

Filmmaking

Wildlife Monitoring

Forensic Photography

Power line Surveying

Damage Assessment

Industrial Logistics

Pollution
Monitoring

HAZMAT Detection

Asset Monitoring

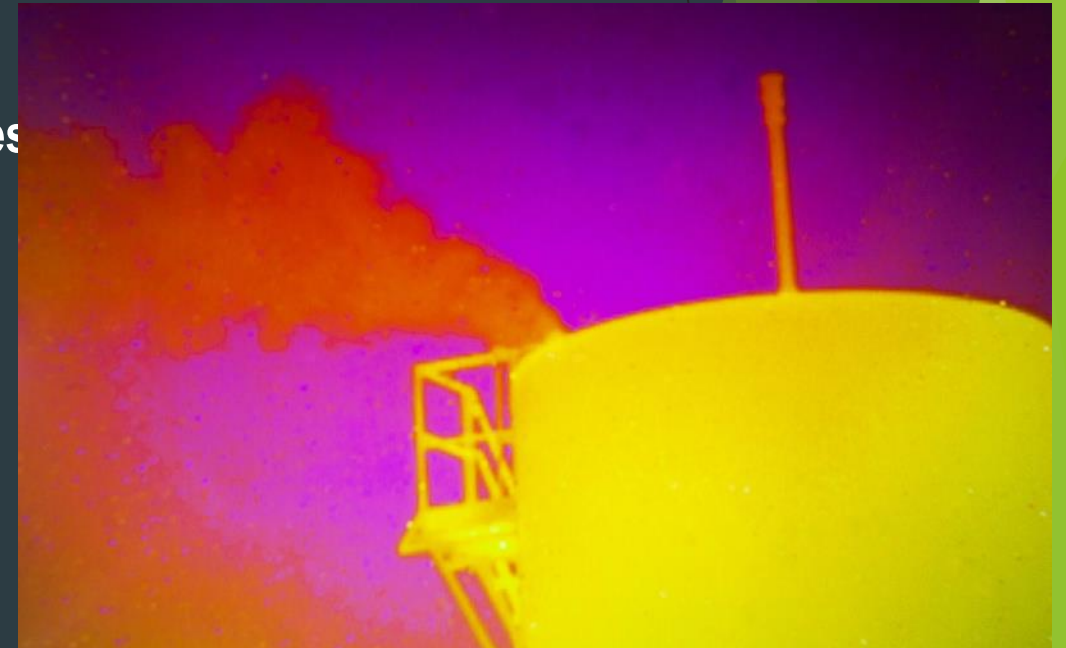
Construction

Cargo



Industry Users

- **BNSF**
 - Using UAS for track inspections
 - Operating under waiver for long-distance for BNSF
- **Chevron**
 - Inspection & Monitoring
 - Evaluating use in oil spill response
- **ExxonMobil**
 - Inspection & surveillance of operations
 - Offshore platforms, refining petrochemical complexes
- **Shell**
 - Flare Stack Inspections
- **Conoco**
 - Inspecting tanker exteriors
 - Estimate a 75% time savings





General view on Flare Stacks and Flare Tips.
View from south.



Detailed view of Flare Tips. View from south.



Part 107 - The Basics



- FAA's regulations for commercial UAS operations
- Ensure safety in three key areas
 - Personnel
 - Equipment
 - Operations



Personnel



- The operator of the UAS must:
 - Hold a part Remote Pilot Certificate
- OR
- Operate under the direct supervision of a Remote Pilot in Command who holds a Remote Pilot Certificate
- Visual Observer (If required to Visual Line of Sight to UAS)
 - Must be able to determine the UAS's location and path of flight without visual aid
 - Must maintain effective communication with Operator or RPIC

Becoming a Remote Pilot

- Must be 16 years old or older
- Must read, write, and speak English
- Must undergo TSA background security screening
- Must pass an aeronautical knowledge exam at an FAA-approved Knowledge Testing Center
 - Part 61 certificate holders with biennial review can Take online training at faasafety.gov instead of the knowledge exam

Equipment

- Unmanned must weigh less than 55 lbs including any payload
- Must be registered with the FAA and carry identifying markings
- Must undergo a preflight inspection to ensure satisfactory flight characteristics



Operating Rules

- Visual line of sight of Pilot or Visual Observer
- Daylight with at least 3 miles visibility
- 400 feet or below or within 400 feet of a structure
- ATC permission required in controlled airspace
- No hazardous cargo
- No careless or reckless ops
- Drug & alcohol restrictions apply to UAS

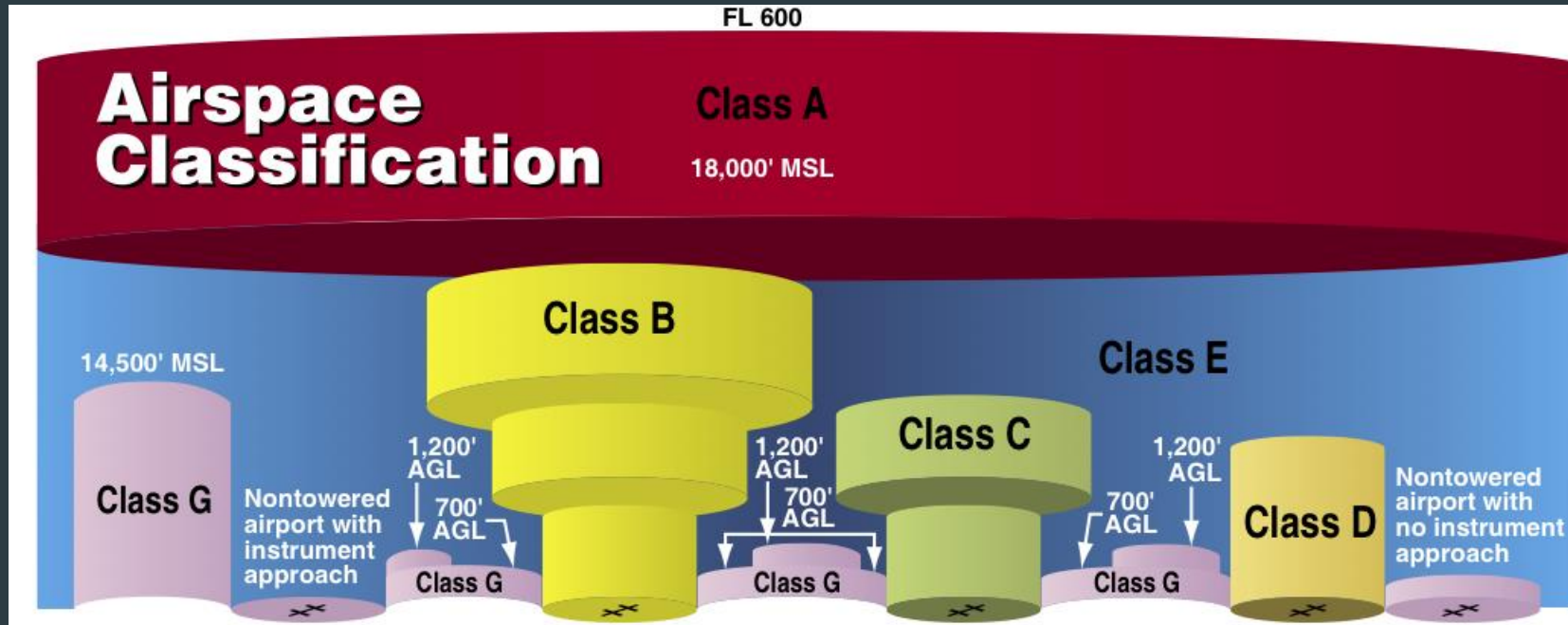


Operating Rules Con't

- No operations over people not directly participating
- Must yield right-of-way
- Max speed of 100 mph
- One UAS per operator



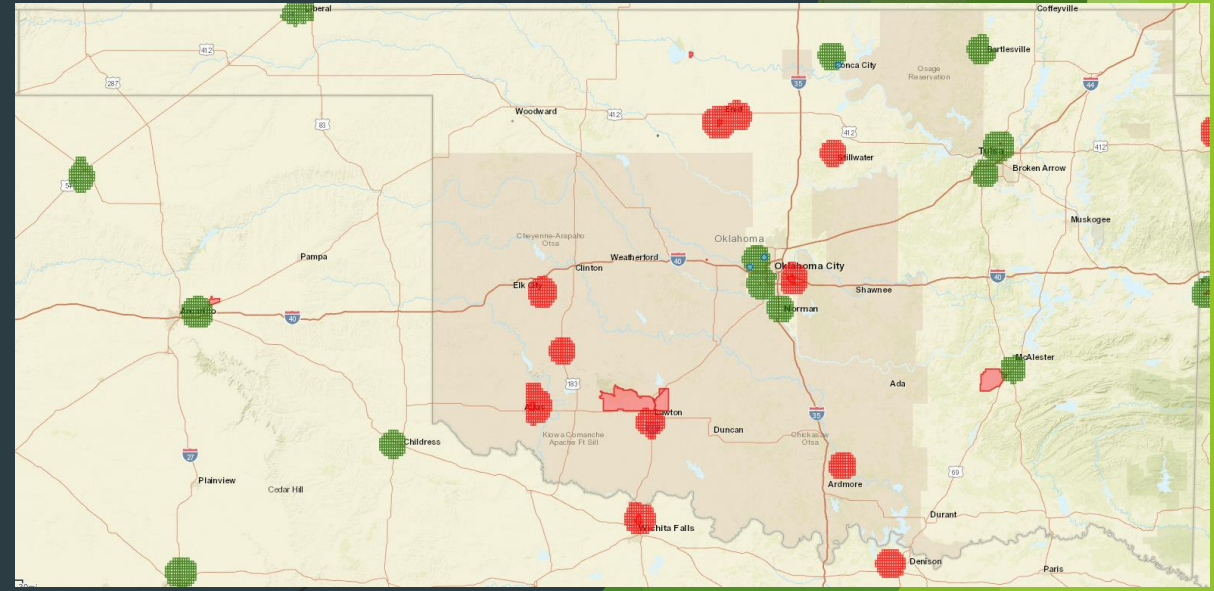
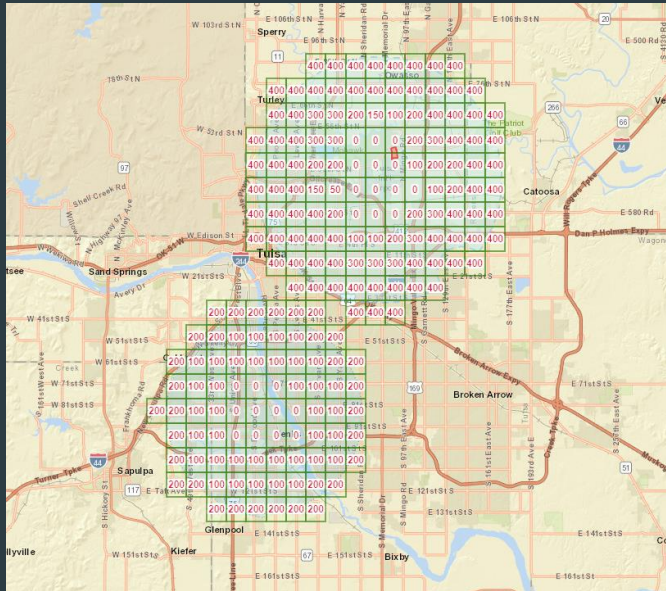
Part 107 Airspace Authorizations



- Operation in Class G is allowed without ATC authorization
- Operations in Class B, C, D & Class E airspace require ATC authorization

Low Altitude Authorization and Notification Capability (LAANC)

- System for real time authorization to fly in controlled airspace
- Third-party data exchanges available during flight planning
- Currently available for 595 airports (Feb 24, 2020)



Most commonly Waived Provisions of Part 107

- Operation from a moving vehicle or aircraft (§ 107.25)
- Daylight Operation (§ 107.29)
- Visual line of sight aircraft operation (§ 107.31, § 107.33)
- Operation of multiple small UAS (§ 107.35)
- Operation over people (§ 107.39)
- Operation in certain controlled airspace (§ 107.41)

Ongoing Research

- **FAA just completed UAS Integration Pilot Program (IPP)**
 - **First steps toward widespread drone use in areas currently requiring operations waivers**
 - **Opening up airspace use**
 - **Beyond Visual Line of Sight Operations (BVLOS)**
- **UTM – UAS Traffic Management**
 - **Research underway to allow fully autonomous UAS operations and allow Beyond Visual Line of Sight (BVLOS) operations.**



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Questions??

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