




# **UAS Industry: Beyond Imagination**

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# Who am I?

- Private pilot, Drone Pilot (Part 107 Remote Pilot in Command)
- 40 years in commercial aviation
- Turned to UAS in 2016
- 2 Books on Drones
- Forecast with Darryl Jenkins on Drone Package delivery
- This week Opinion piece in AvWeek and Space Tech
- 3 successful start-ups
- Adjunct Professor Embry Riddle Aeronautical University
- Undergrad and Masters in Economics
- Doctorate in Management



# What is a Drone?

- Unmanned Aerial Vehicle (UAV) or Unmanned Aerial Systems (UAS)
  - sUAS = small UAS <55 lbs ... all consumer drones
  - Next generation for UAM will be much larger
  - Nicknamed Drones because of the sound they make
- Military has been using drones for decades
- Miniaturization technology evolved in the early 2000s to enable the production of civilian Drones
- Drones are aircraft and regulated by the Federal Aviation Administration
  - Local government regulation of drones is a big issue in the industry
    - Privacy and viewed as a revenue opportunity for registration fees
  - Legally cannot shoot down aircraft in the US, hence can't shoot down drones



# Milestones in Commercial Drones

This is a VERY New Industry

Congress mandated  
FAA create rules for the  
operation of drones

2012

FAA provided authorization for  
film and TV production  
companies for  
Tom Cruise to star in  
*Top Gun 2* alongside drones

2014

FAA began  
requiring small  
drones to be  
registered

2015

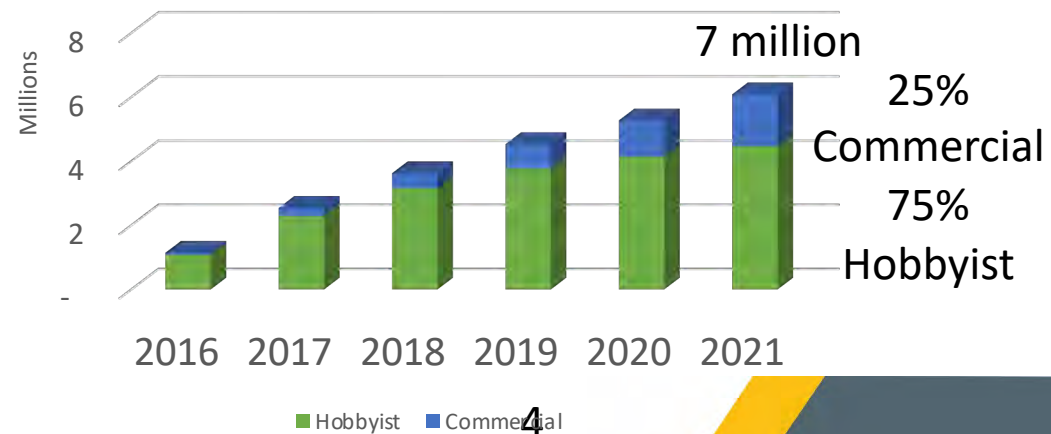
FAA rules regarding  
hobbyists versus  
commercial drone  
operators went  
into effect

2016

Today more than 1.1 million  
drones are registered in the  
U.S. Forecasts are for 7 million  
by 2021

Compare to 350,000  
manned aircraft in 100+  
years of flight

sUAS Fleet in USA



# Commercial vs Hobby

## Commercial

*“Flying for work, business, non-recreational reasons, or commercial gain.”*

This typically includes flying a drone for hire, compensation, to provide a service, or for economic benefit of an entity or person. Intended use, not compensation, is the determining factor.

Considered FAA regulated aircraft operations under Part 107 and requires a licensed drone pilot

## Hobbyist

*“Flying for enjoyment, recreation, outside of work and not for work, business purposes, or for compensation or hire.”*

Considered a model aircraft

Does not require a drone pilot license

Limitations on FAA’s ability to regulate

# Rules and Registration

## Licensing – FAA Part 107 Rule

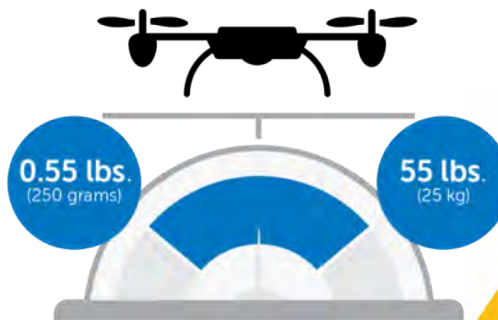
- If a drone is being flown as hobbyist, no licensing is required.
- If a drone is being flown commercially, under the FAA UAS Part 107 rule, the pilot must obtain a "Remote Pilot Airman Certificate" As of the end of 2017, there were 70,000 licensed, commercial drone pilots.
  - **FAA Remote Pilot Knowledge Test:** 60 question multiple-choice exam administered at FAA-approved knowledge testing centers; costs \$150
  - **Other requirements:** Pilot must be 16 years of age and must pass TSA security vetting. There is no practical testing of a pilot's operating skills.
- Penalty for not complying with rules is \$1,100 per violation for the pilot and \$11,000 for the organization



# Part 107

## Registration with FAA

- Federal law requires that ALL small unmanned aircraft (drones) weighing more than .55 pounds and less than 55 pounds be registered with the FAA
- Registration is required for both recreational and commercial use
  - Registration for hobbyist has been controversial, but Congress passed a law Dec 2017 requiring all drones to be registered under the National Defense Authorization Act
- Drones must be marked with the registration number



# Operating Limitations

Amazing technology, but untested operational performance



Testing Battery life – max 25 min, but with Wind or Cold Temps, Much Less



Testing Wind Conditions - Flying Against the Wind Drains Battery



Impacts of Temperature  
Max 107 F  
Lowest 32 F  
Low Temps Drain Battery

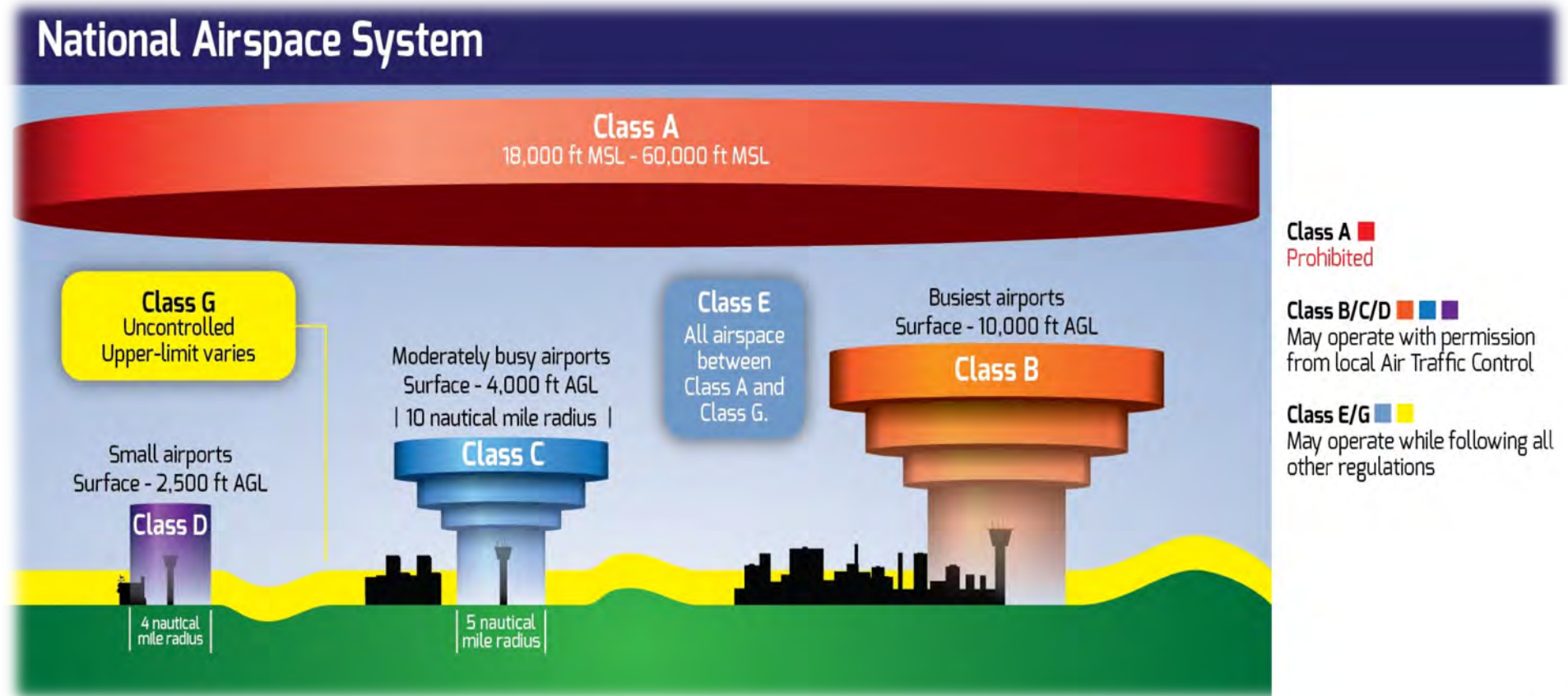


Operations during Precipitation

# Integration Into Air Space

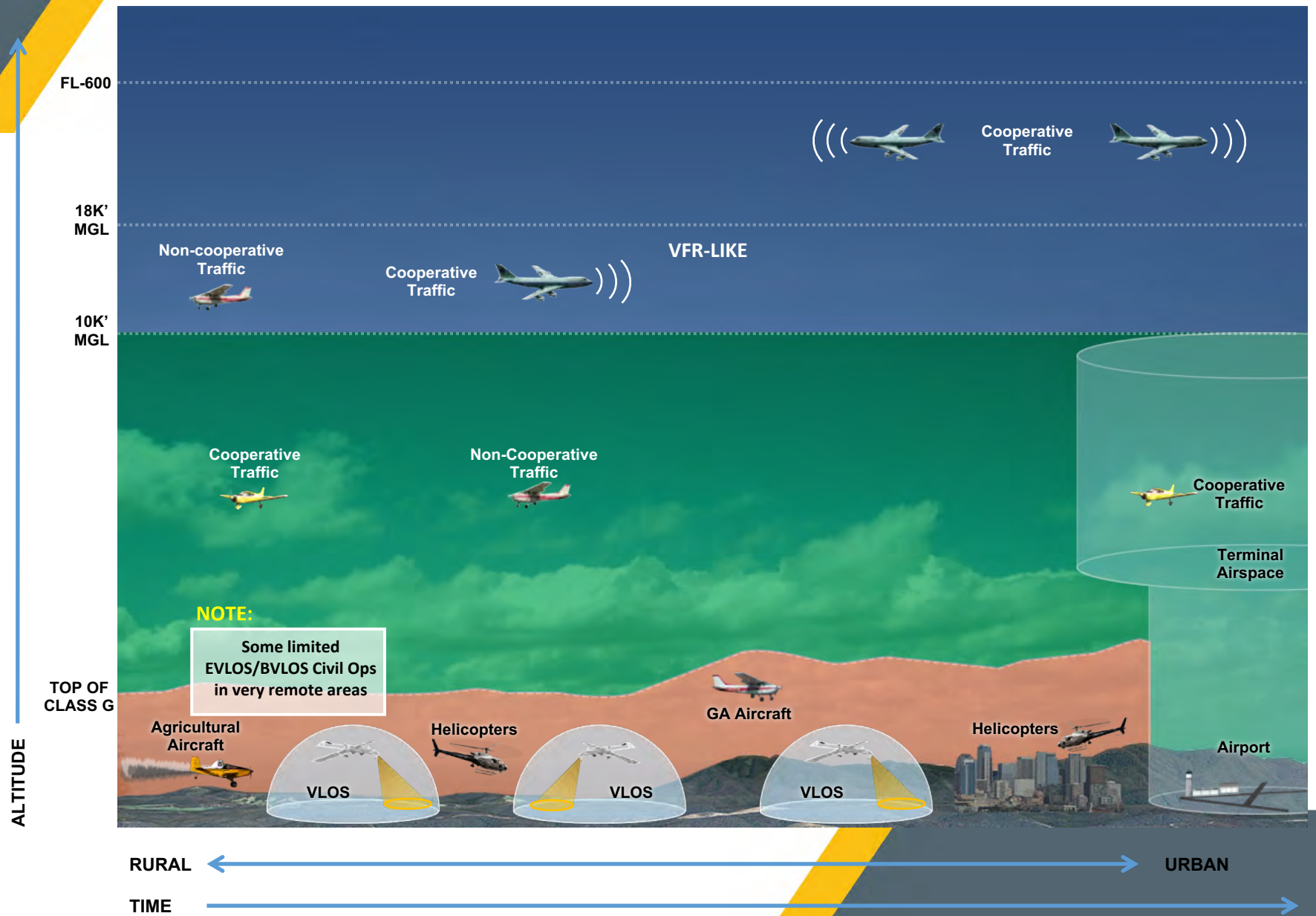
UAS can operate in Class G with no ATC clearance

Commercial UAS need clearance to operate in controlled airspace






# UAS Air Space Today is Segregated, Not Integrated





# Today We Will Discuss

- Latest innovations in technology
  - Case studies of using UAS for commercial operations
  - Visions for true UAS air space integration
  - Utah's planning for a UAM traffic management system
  - Utah's leading edge research into UAS and UAM
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- And then we go outside and get to fly drones and talk with our exhibitors!
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**Thank you!**

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