



# Katie School of Insurance UAV/Drone Research Project

- ▶ The Risk Management  
Implications of UAVs/Drones

# Team Members

# Project Inception

- Began spring of 2014
- Started to address concerns
- Help the developing world
- Evolved over time

# Purpose and progress as of Spring 2015

- ✦ Risk Management Research in the Operation of UAVs/Drone
  - ▶ Presentations
  - ▶ Conferences
  - ▶ Networking/Shared learning

# Why UAV Integration

- Between 2015-2025, \$89-120 Billion in worldwide spending on UAV market
- 90% of the Potential Markets for UAV will be in public safety and precision agriculture
  - Recently insurance markets

Agricultural

# Overall

- Unmanned Aerial Vehicles give **farmers and insurance companies** a more **accurate and timely estimate of crop and live stock losses** while enabling farmers to implement best management practices.



# Agricultural uses

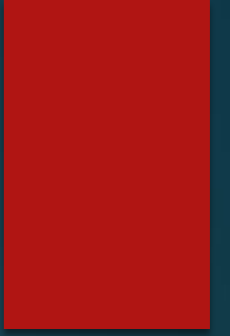
- Weather Damage
- Pest and Weed Inhabitation
- Water resource management/sustainability



# Conclusion

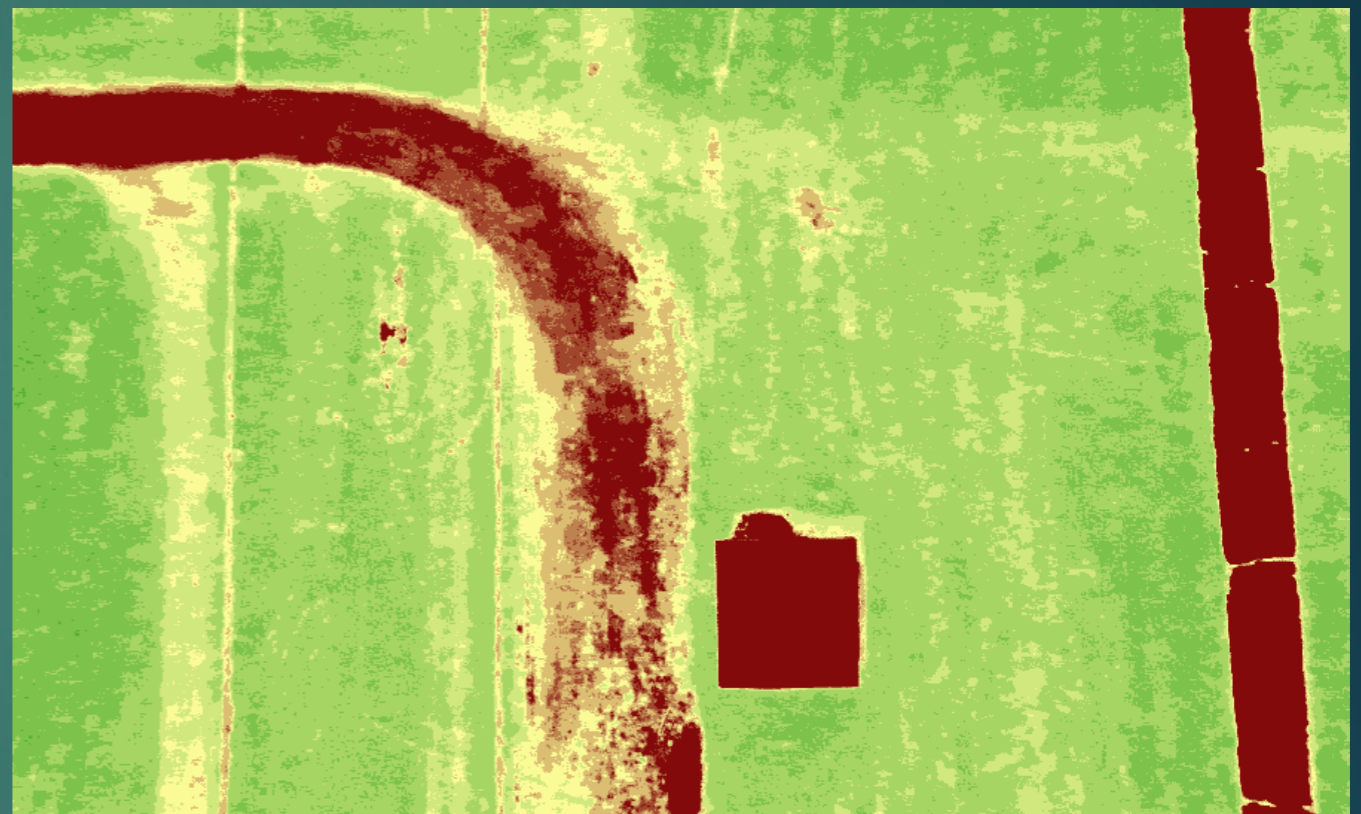
- Improvement of management practices
- Environmental Sustainability
- Reducing cost
- Increasing yield

NDVI



# What is it?

- Normalized Difference Vegetation Index
- Plant Stress
- Early Indication of Pest or Diseases



# Commercial Applications

- Public Safety, Law Enforcement, and Security
  - Ex: [firefighting](#)
- Logistics/Utilities
- Film/Photography
- Risk assessment/damage evaluation

# Why use UAVs?

- Lower Cost/Investment
- Mitigates hazards
- No Time Schedule
- More Precise





# Information Technology

# Problems with UAV's

- Security
- Transmission Issues
- Software/Hardware Bugs

# Software Engineering

- ★ Great concurrency
- ★ Great error handling
- ★ Encourages good practice
- ★ Easy to deploy
- ★ Fast



# Encryption

- Mathematically provably secure
- Would take longer than age of universe/more power than sun will ever put out to break
- Easy to plug and go
- Computationally cheap

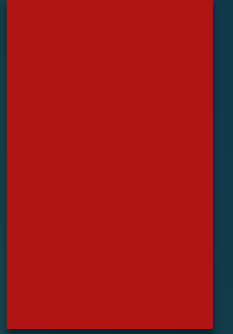
# Network Reliability

- Resistant to packet loss
- But not too resistant
- Flexible

# Client/Server Model

- Server is trusted and secure.
- Client is untrusted.
- Where to store data?

# Possible Development Opportunities



- Collision Avoidance
- Computer Vision
- Autonomy
- <https://www.youtube.com/watch?v=GnuQzP3gty4&feature=youtu.be&t=50>



# Legal Framework and Regulation

# Tech Outpacing Regulatory Powers

- “Technology has advanced more in the last thirty years than in the previous two thousand. The exponential increase in advancement will only continue.
  - Neils Bohr, 20<sup>th</sup> Century Physicist

# Positive FAA Response

- Certificate of Authorization process for public and civil UAV operations
  - Heavily influenced by European Union
  - Systems are legally defined as “aircraft”  
*Huerta v. Pirker (2014)*
- Model Aircraft: Operators exempt from FAA authority if they comply with § 366 of the FAA Modernization and Reform Act
  - Cannot be used to generate revenue
  - <400 ft, <55 pounds, visual line of sight

# Civil: 2 Tiers of Operations

- § 333 Exemption: “Blanket” approval for commercial operations anywhere in the country except major cities and restricted areas, 137 granted thus far
  - <200 ft, <55 pounds, Visual Line of Sight
  - Must comply with all preexisting aviation code
- Special Airworthiness Certificate: Permits R&D outside § 333 limitations
  - Recently granted to Amazon, Bell Helicopter, numerous defense and private military firms



# Public (Governmental)

- Certificate of Authorization: 60 day online approval process for public institutions
  - Active for 2 years
  - Permits preapproved operations within designation area, highly flexible
  - 79 approved, including universities, police departments, and numerous federal agencies

# Right to Privacy

- California v. Ciraolo (1985): Activity visible from public airspace can be surveyed by the state without a warrant
- Kyllo v. United States (2000): Warrant required for surveying activity not in “plain view” of public airspace
  - Application to Private Sphere: Prior consent of surveyed parties is strongly encouraged to avoid privacy lawsuits

# Privacy Policy

- Insure only in FAA licensed operators who have a fully monitored and internally controlled privacy policy
  - Nationwide Commercial Use is Fast Approaching
  - Early Adopters/Investors Will Benefit Most

# Risk Management

# Insurance Considerations

- Potential underwriting assessments
  - Size, function and intent
  - Technology capabilities
  - Areas of Operation
  - Federal Aviation Administration approvals
- ISO released rules and guidelines

# Specific Exposures

- Physical damage, Ground damage and Air to Air collision
- Privacy and Nuisance
- Cyber Liability
- Commercial vs Personal Use

# Physical, Ground and Air to Air Collision

- Damage to UAV
- Ground Damage and falling objects
- Carrying Contents – Pollution
  - This is one of the higher exposures
  - ISO CGL Exclusions (Pollution, Aircraft, Model Aircraft)
- Air to Air collision
  - Collision Avoidance (mitigate exposure)

# Privacy and Nuisance Liability

- Imaging Technology
- Loss of Use and Enjoyment (Nuisance)



# Cyber Liability

- Hijacking
- Data Loss
- Data Hacking
  - Storage and disposal of data is essential for exposure mitigation

# Commercial vs. Personal

- ▶ Restrictions mostly apply to Commercial
- ▶ Potential fraud/Negligence by insureds
- ▶ Potential loophole
  - ▶ Depends on companies policy language

# ISO Guidelines

- ▶ “Unmanned Aircraft”
- ▶ Policy sections “Unmanned Aircraft” and “Aircraft (other than unmanned), Auto, or watercraft”
- ▶ Exclusions for Unmanned Aircraft Coverage A & B
- ▶ Scheduling form for UAVs/Drones (limited coverage)
  - ▶ Descriptions required
  - ▶ Aggregate Limit

# Distribution Avenues



- Agricultural Insurers
- Commercial Insurers
- Excess & Surplus
- Specialty markets

# Potential Benefits for Insurers

- ▶ Loss Control/Claims assessments
- ▶ Risk evaluation
  - ▶ Could lead to less losses
- ▶ Faster claims handling
- ▶ 3D mapping of claim area

# UAV Demonstration & Questions?