



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

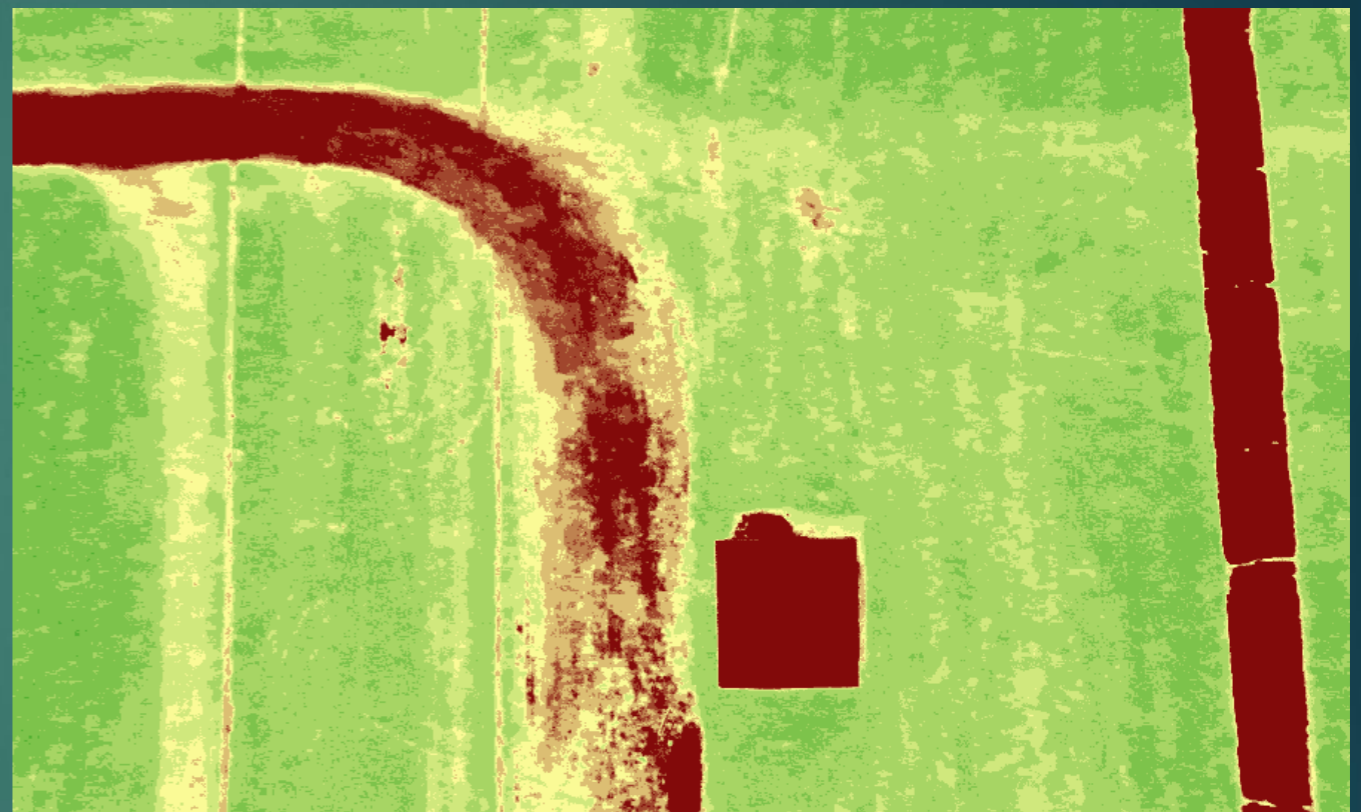
Conclusion

- 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

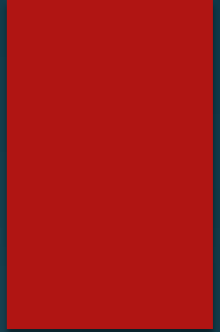
Network Reliability

- 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, 20th 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?