Special UAV Session

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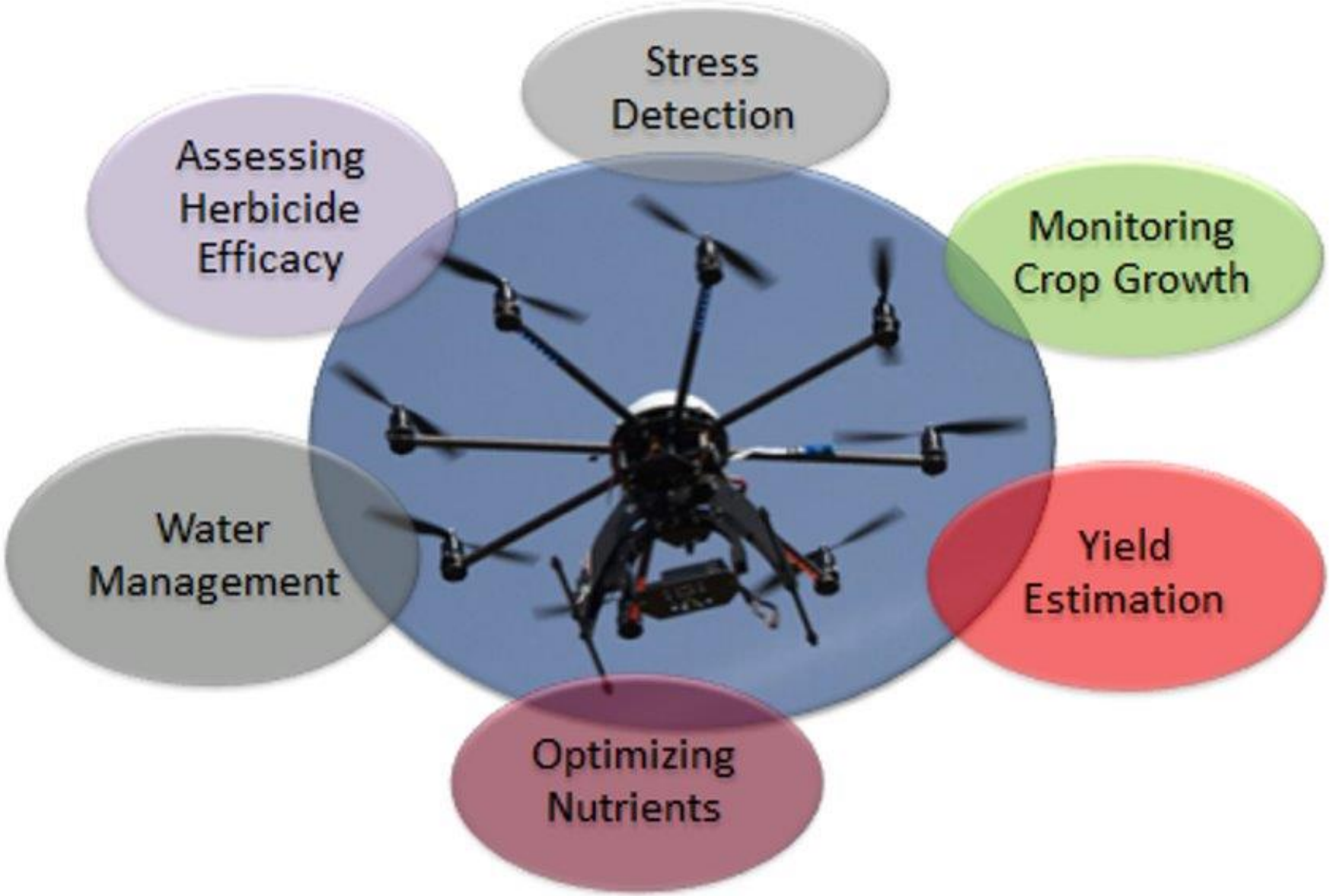
UAVs in Agriculture



Unmanned Aerial Systems/ Drones

- Since the mid 2010's unmanned aerial systems (UAS) have begun to be evaluated for their uses in the agricultural industry
  - Research areas: Scouting, plant monitoring, livestock tracking, water quality monitoring, plant phenotyping, evaluating of flood risks, ETC.

- Research is being performed around the country and globe to develop these findings on the effectiveness of this quickly evolving technology platform

- Categorized by size, brands, functionality, flight mechanism, license required

Unmanned Aerial Systems/ Drones

So why not just go out tomorrow and buy a drone and start flying it on your farm?

- First off you need to identify the needs of your operation
  - What tasks or operations could be performed or aided on your farm by a drone

- Does the drone you need require anything additional?
  - For commercial use, a FAA 107 pilot's license is required
  - Additional equipment: multiple batteries, attachments, camera systems, GPS systems, method for moving all of this, ETC. (it can become expensive quick)

- Large spray/spreading drones require additional Licensing
  - FAA 137 pilot license and permits for the areas you intend to apply at

- Tank sizes and battery life limits the mission length, or will require several filling and battery change stops

FAA Part 107

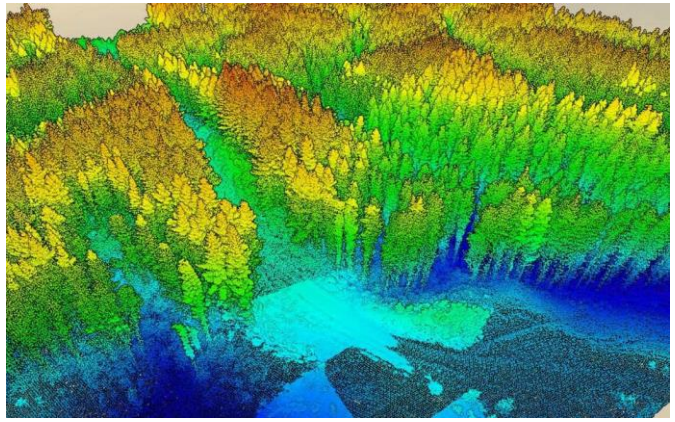
- Required for all drone pilots, operating non-sprayer/spreader platforms, and under 55lbs
  - Part 137 is required for the application UAVS
- The test covers: Regulations (rules and limitations), Airspace classification and operating requirements (understanding aeronautical maps), Weather, and Operation of the UAV
- Test Prep:
  - https://www.faa.gov/sites/faa.gov/files/regulations_policies/handbooks_manuals/aviation/remote_pilot_study_guide.pdf
  - YouTube has a lot of material on the subject as well
  - Multiple smartphone apps (many free options) that can be used

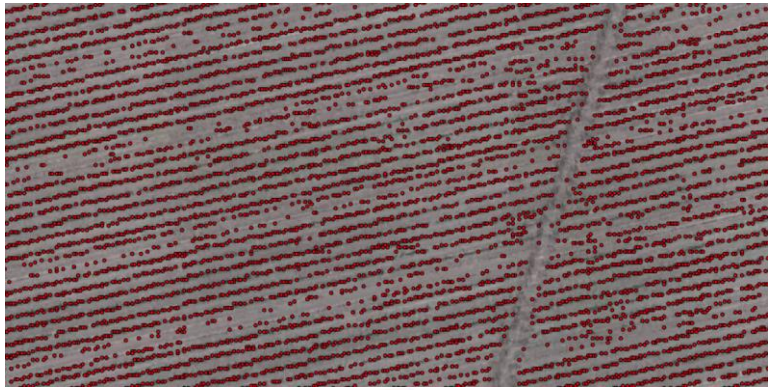
DJI Update

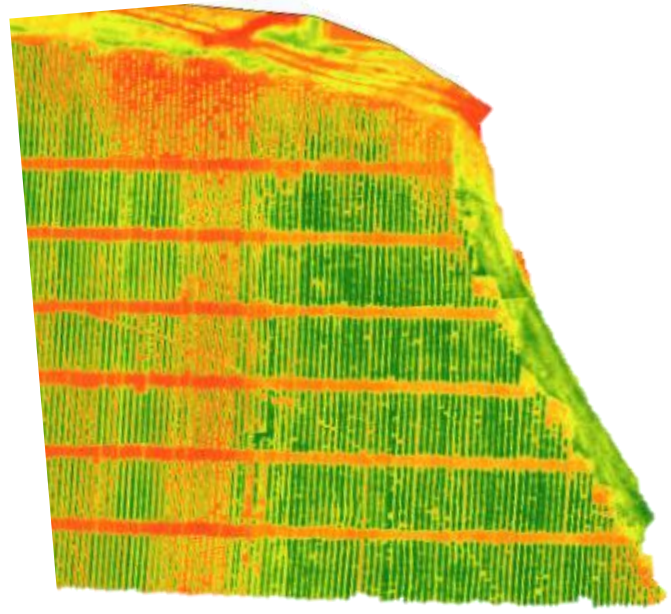
- Countering CCP Drones Act
- Restricts Chinese-manufactured drones
  - Would be unable to fly them
  - Not exclusively but primarily affects DJI UAVs due to the popularity of the platform
- UGA can still purchase and use them, however, other universities and government agencies can not purchase or use them
- Was not included in the FY25 National Defense Authorization Act (NDAA) but still fluid area and could change

Scouting Operations

- Checking general field conditions
  - Drainage issues, visual inspection of the field, burndown or application efficacy checks, field surveying, and 3D/ elevation mapping
- Crop health (vegetative indices)
  - Stress monitoring, leaf area indexing, nutrient recommendations, drought assessments
- Weed mapping
- Stand counts







Ground Control Points

- Commonly called GCPs
  - Can either be a more permanent structure (painted stone blocks) or a temporary structure (plywood)
  - Depends on the return

- Need to collect for image georeferencing correction
  - Will require a GPS receiver to collect the coordinate points for these stationary object

Data Handling

- How do we manage the large quantity of data??

- Develop a file naming system and folder structure to allow for efficient organization and utilization
  - Ex: Grower → Season → Field → File name: grower_year_field_operation
  - Ex: Colco_25_MS

Image Stitching Options

- This is almost always a required step with UAV imagery

- Free:
  - OpenDroneMap (ODM)
- Paid:
  - Pix4D – Industry standard
  - DroneDeploy
  - Agrisoft Metashape