

Drone Spray Technology and Regulation

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Agriculture and Natural Resources

■ Cooperative Extension

Agriculture Taking a Flight



- Around mid 2000s, commercial drones became available for capturing imagery, marking a shift toward more accessible aerial data collection.
- Over two decades, the use case of drones have expanded to other agricultural uses such as
 - Applying chemicals
 - Spreading seeds, fertilizers
 - Release of beneficial insects.

Agriculture Taking a **Safer** Flight



- Rising Costs
- Lack of innovation
- Labor Constraints
- Environmental & Terrain
- Health & Safety

Crop Duster Crashes into Lettuce Field

No one was hurt when the helicopter went down while doing aerial agricultural spraying Wednesday morning.

Helicopter spraying pesticides crashes near Gonzales

Pilot walked away with no injuries

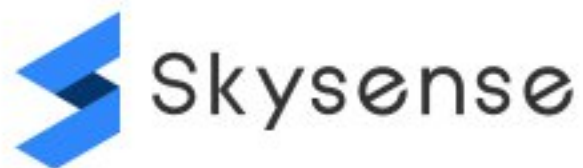
Agriculture Taking a Safer Flight



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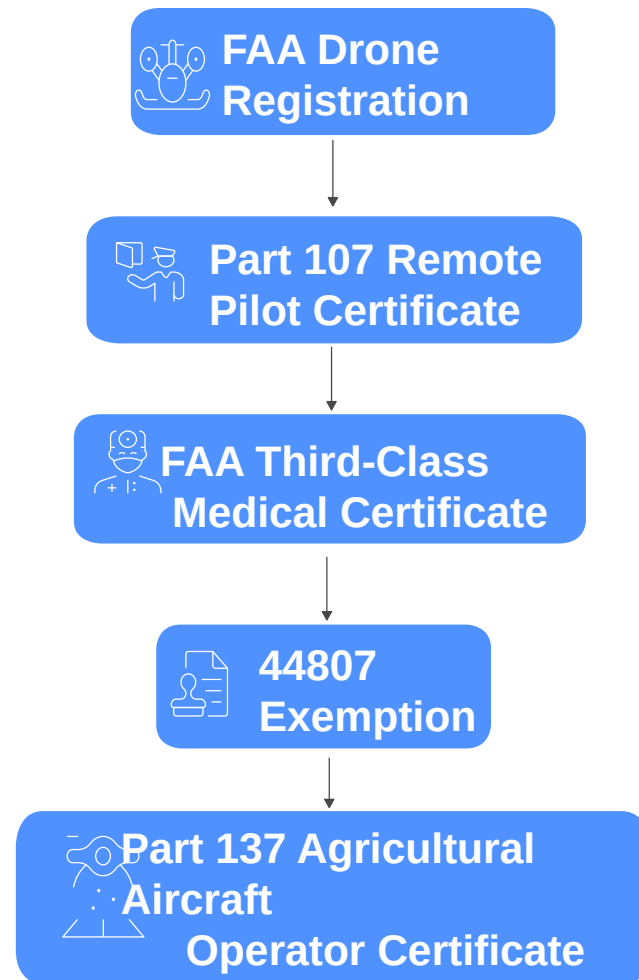
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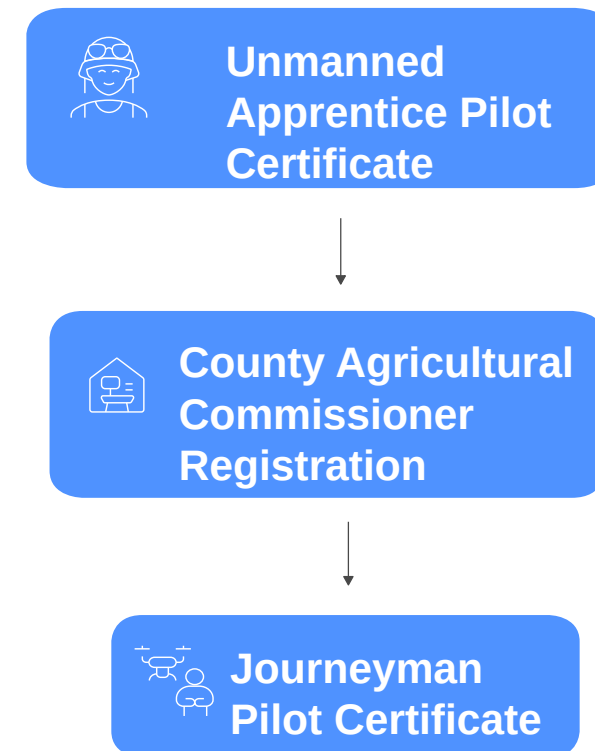
How one can become a drone spray pilot in California

FAA & CA DPR

PHASE 1: Federal Aviation Agency



PHASE 2: California DPR





Drone Gross Weight Matters

Under 55 Lbs.

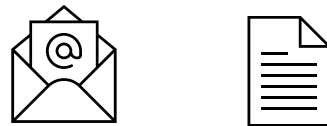


FAA DroneZone website

5 minutes and \$5

**F-Number
(Starts with F)**

Over 55 Lbs.



FAA 8050-1: Aircraft Registration Application
FAA 8050-88: Affidavit of Ownership

FAA Aircraft Registration Branch
Oklahoma City, OK

45-70 days and \$5

**N-Number
(Starts with N)**



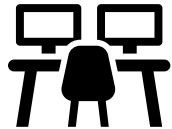


FAA Part 107 Certificate

Certifies that you have the knowledge and skills required to fly a drone safely and legally in the National Airspace System for commercial purposes.



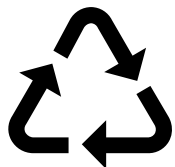
- Must be 16+
- Proficient in English



- Self study
- FAA websites, YouTube, Paid materials



- Book in-person test date and center (FAA-approved)
- Get at least 70%



- Must complete recurrent training every 24 months Online



Scan me!



Medical Certificate

Under the most recent FAA guidance, pilots operating heavy drones (**over 55 lbs**) and **in night** require a **Third-Class Medical Certificate**.



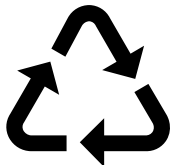
- Must see an FAA-certified **Aviation Medical Examiner (AME)**.



- Local small airport or flight school and asking the pilots



- If you have disqualifying conditions (like heart issues, diabetes, or kidney stones) consult a private service prior to the exam



- Valid for 60 months if under age 40.
- Valid for 24 months if age is 40 or above.



44807 Exemption

To legally use heavier registered drone, for commercial purpose including agriculture spraying without specific manned aircraft regulations we need exemption “44807” from FAA.



- Submit a petition to FAA docket
- Require prior steps, manuals (operations, training, and safety), and an approved aircraft



- Aircraft on the “List of Approved UAS”. Latest one was updated on July 8th 2026. (www.regulations.gov)



- Approved aircraft allows you to go through a quicker “Summary Grant” process

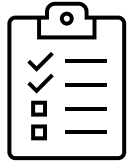


- Keep Maintenance logs
- Valid for 24 months, file for renewal at least 120 days before



Part 137 Certificate

The federal certificate you need to legally spray pesticides from an aircraft and that includes drones



- Require registered drone, third class medical certificate, Part 107, and 44807 exemption.



- “Knowledge and Skills” test (Self certification by Chief Supervisor (you) or by the appointee from your employer)



- No more ‘ meeting with local Flight Standard District Office (FSDO)’.
- Fill and email FAA Form 8710-3 to FAA office listed in the exemption.

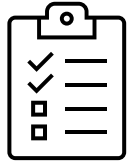


- Keep Maintenance logs, provide monthly reports to FAA every 5th of the month.



Apprentice Pilot Certificate and county registration

All new drone spray pilots in California must start as an **Apprentice Pilot Certificate**



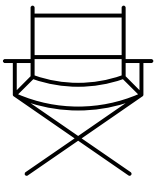
- Fill and submit the Pest Control Aircraft Pilot Certificate Application
- Add all the federal certifications



- Take and Pass the “Laws, Regulations, and Basic Principle” (exempt if you have QAL) and “Apprentice Pilot Certificate Exam



- Register with the Ag Commissioner’s office in each county you intend to perform spray application.

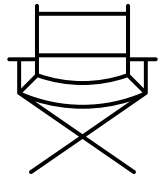


- Fly under the supervision of Journeyman Pilot.
- Manned or unmanned Journeyman supervision



Journeyman Pilot Certificate

Unsupervised drone spray application visa **Journeyman Pilot Certificate**



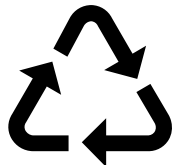
- Fly under the supervision of Journeyman Pilot for at least one year and log in at least 50 hours of flight time.



- Submit New Application form (\$135) and a Statement of Supervision form signed by the Journeyman pilot(s) who supervised you.

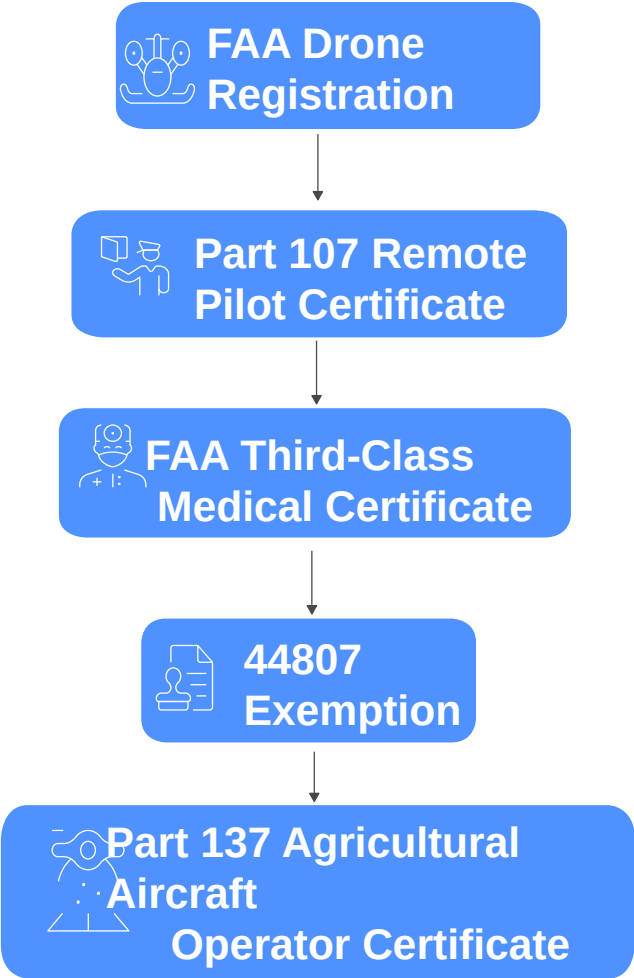


- Take and Pass the Journeyman Pilot Certificate exam (\$115) with 70% or higher.

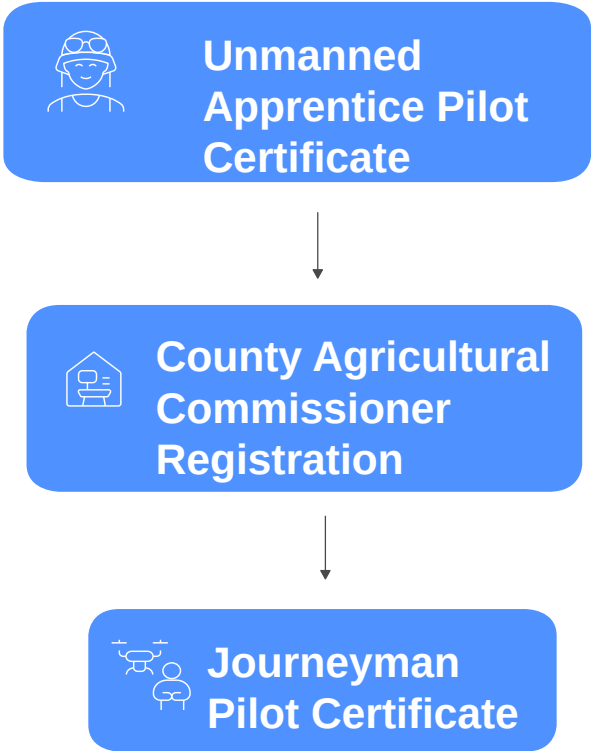


- Valid for 1 year
- "Second-year Fee Notice" for an additional \$100 to extend for 2 years

PHASE 1: Federal Aviation Agency



PHASE 2: California DPR



Ever Changing Landscape

Regulations & Technology itself

Drone Technology: Regulations

- **Federal Communications Commission (FCC)**'s halted new authorizations for foreign-made drones and critical components, including motors, batteries, and flight controllers.
- There are two temporary exemptions lasting through the end of 2026.
 - Drones on the Defense Department's '**Blue UAS**' list,
 - Those meeting '**Buy American**' domestic manufacturing standards (65 % through 2028 and then 75% beginning 2029) can still be approved.

Drone Technology: Regulations

Existing Drones are Safe: Current drones are completely legal to continue in the field.

Future hardware and software upgrades, replacements, and repairs may face tighter supply chains and higher costs.

Action Plan:

Inventory your current equipment now, and stock up on essential backup parts. If buying a new drone, explicitly ask if the exact model is currently FCC-approved or falls under any of the 2026 exemptions.

Drone Technology: Regulations

Federal Communications Commission (FCC) Adds Foreign-Made Drones and Key Parts to the Covered List: What Ag Drone Users Need to Know

January 6, 2026 By Paramveer Singh



FCC Covered List Update: Two Temporary Exceptions for Drone Supply in 2026

January 12, 2026 By Paramveer Singh



Drone Technology: Evolution



Questions?

Scan for UC
ANR Blog



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Drone Technology: UCCE Research

Objective 1: To evaluate commercial unmanned aerial application systems (UAAS) for spray deposition and uniformity under different operational parameters.

Objective 2: To evaluate and compare the spray deposition and penetration in different regions of the lettuce canopy using different drone technologies.



Methods

Drone: XAG P100H Pro 2023

Two rotary atomizers nozzles

Load capacity of 13.2 gallons

Droplet size: 230 μm

GPS: California Real Time Network
(CRTN)

Treatments:

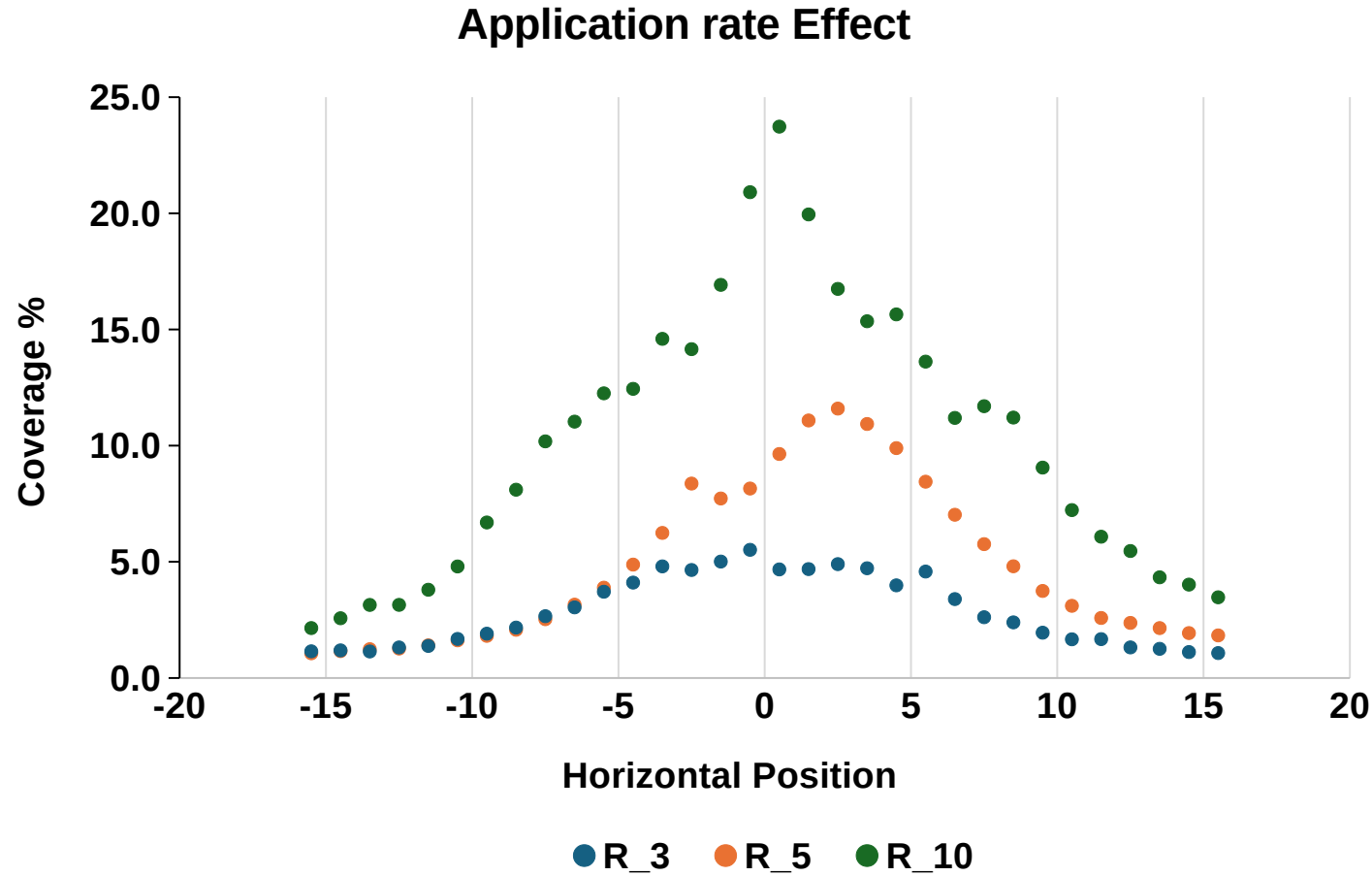


Factors	Levels
Ground speed (S)	10 and 12 mph
Elevation (E)	10 and 14 ft
Rate (R)	3, 5, and 10 gpa

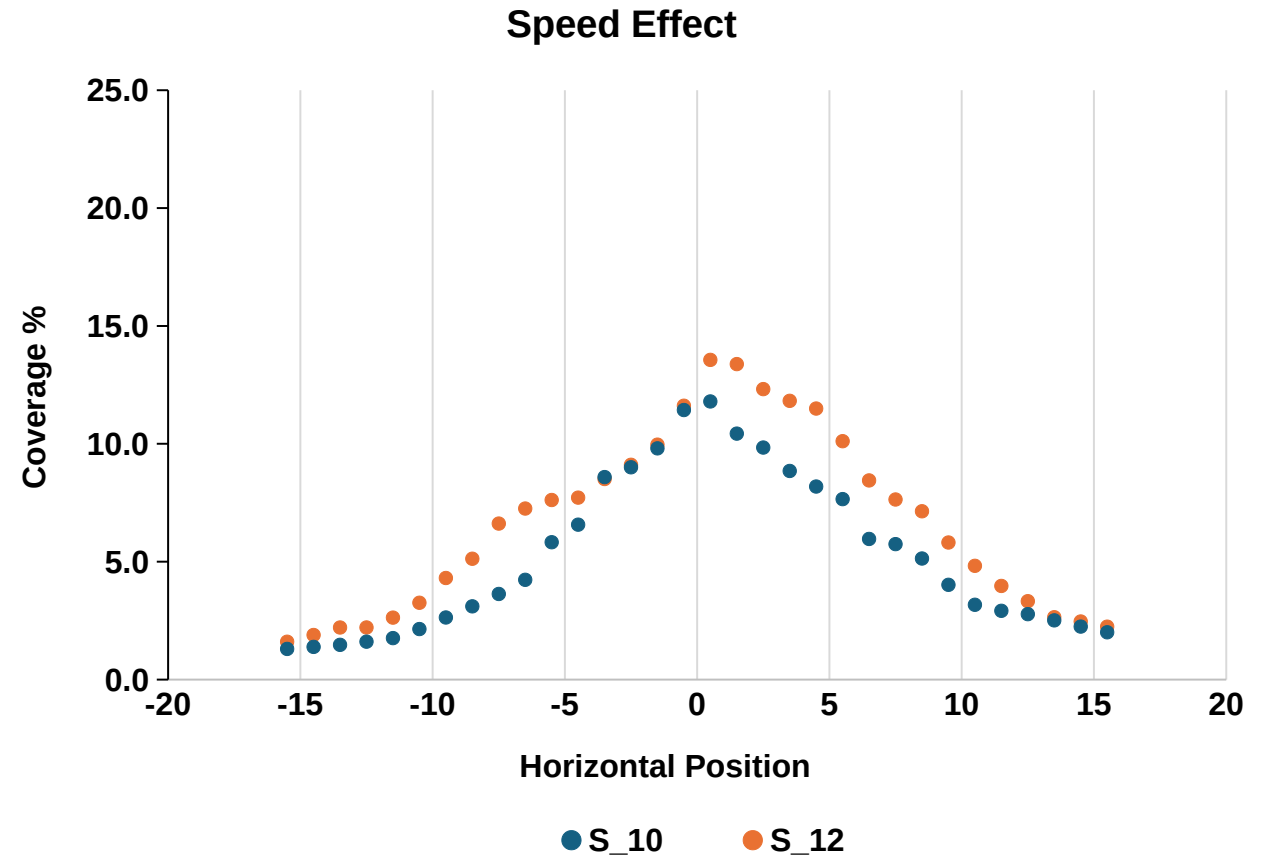
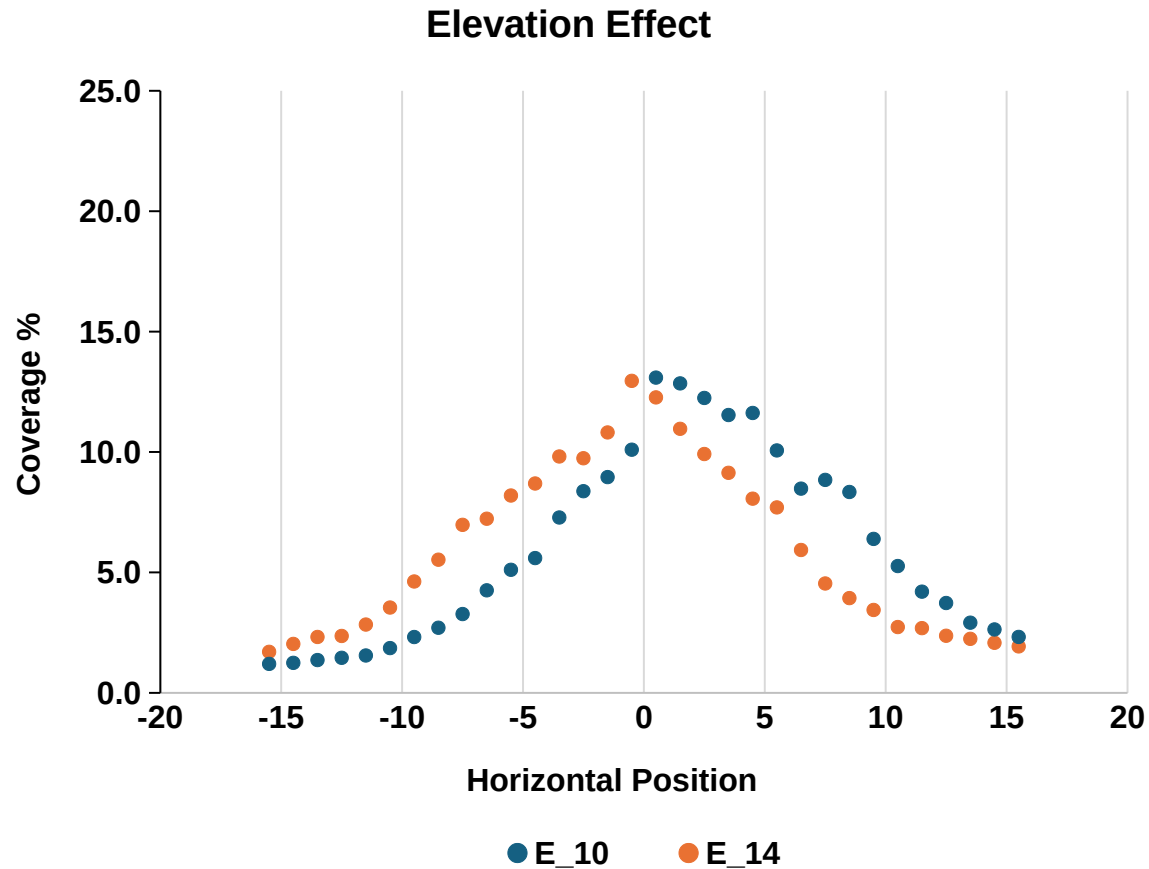
Methods



Drone Technology: UCCE Research



Drone Technology: UCCE Research



Drone Technology: UCCE Research

- Process the data for effective-swath width, look at interaction effect of various operational parameters on uniformity and coverage.
- Do multiple pass spray uniformity data collection at different overlapping percentages (20% is the standard).
- Carry out spray penetration data collection on lettuce.
- Publish blog articles discussing the results, protocols for doing performance evaluation trials for upcoming drones, and as well as technical operational challenges.

